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Journal of the Society of Arts.

FRIDAY, MARCH 19, 1858.

CONVERSAZIONI.

The Council have arranged for two Conversazioni during the present session; the first on Saturday, the 24th April, at the Society's House, for which a card will be issued to each member; the second on Saturday, the 8th May, at the South Kensington Museum, the card for which will admit a member and two friends, ladies or gentlemen.

EXAMINATION PRIZE FUND FOR 1858.

The following circular letter has been addressed to the Members of the Society :—

Society for the Encouragement of Arts, Manufactures, and Commerce, Adelphi, London, W.C., Jan. 30, 1858.

SIR,—I am instructed by the Council to inform you that the Examination Prize Fund for 1858 is now opened. The donations for 1857 were contributed by twenty-three Members, and there is a small balance to carry forward.

The Council draw attention to the fact, that last year's Examinations were limited to two centres. At these two centres, pupils from thirty-seven Institutions only presented themselves; ten of them were from the metropolitan district, London being one centre; sixteen from Yorkshire, Huddersfield being the second centre, leaving but eleven for all England, Ireland, Scotland, and Wales. This unequal distribution was one of the reasons which satisfied the Council that the system was not adapted to meet the wants of all the Institutions. They, therefore, resolved to bring the Examinations to the very doors of the Institutions, by such step of course throwing open the prize fund to the students of every Institution.

The Council have also decided on contributing a certain mileage towards the travelling expenses of those candidates who desire to receive personally and publicly their prizes, and also £5 towards the travelling expenses of each pupil, who, obtaining three of the Society's certificates of the first class in the subjects contained in the Oxford programme, is desirous to contend for the degree of Associate at the Oxford Examinations. These changes lead the Council to believe that a considerably larger sum than last year will be required for the prizes, and I am, therefore, instructed to draw the attention of all the members to the circumstances.

Donations can be remitted to Mr. Samuel Thomas Davenport, Financial Officer, Society of Arts, Adelphi, London, to whom Post-office Orders should be made payable.

I am, Sir, your obedient servant,

P. LE NEVE FOSTER, Secretary.

The following is the list of Donations up to the present date :—

J. D. Acland, Member of Council.....	£ 5 5
John Ames.....	5 5
J. G. Appold, Auditor.....	10 10
T. H. Bastard.....	5 0
R. L. Chance.....	5 5
Harry Chester, Vice-Pres.	10 10
Henry Cole, C.B., Vice-Pres.	1 0

H. D. Cunningham, R.N.	£1 1
C. Wentworth Dilke, Vice-Pres. Chairman of Council (third donation)	10 10
Thomas Dixon	1 1
Lieut.-Col. F. Eardley Wilmot, R.A.	5 0
Lord Ebury	5 0
J. Griffith Frith, Member of Council	5 5
J. W. Gilbert, F.R.S., Treasurer (second donation).....	10 10
F. Seymour Haden (annual)	2 2
William Hawksworth	1 1
Edward Highton (annual)	2 2
James Holmes (annual)	1 1
The Marquis of Lansdowne, Vice-Pres.....	20 0
George Lowe, F.R.S.	1 1
The Master of the Mint, Member of Council (second donation).....	10 10
Sir Thomas Phillips, Member of Council ...	5 5
William T. Radford.....	1 1
Charles Ratcliff, Hon. Local Sec. (annual)...	10 10
William Tooke, F.R.S., Vice-Pres.....	10 10
Arthur Trevelyan	1 0
T. Twining, jun., Vice-Pres.	10 10
Dr. J. Forbes Watson	1 1
G. F. Wilson, F.R.S., Member of Council (third donation).....	10 10

EXAMINATIONS.—LOCAL BOARDS.

The following circular has been issued by the Local Board at Leeds in connection with the Yorkshire Union :—

THE LEEDS LOCAL EXAMINATIONS COMMITTEE AND BOARD OF EXAMINERS, IN AID OF THE SOCIETY OF ARTS EXAMINATION SCHEME.

Leeds, 22, East Parade, March , 1858.

TO THE PRESIDENT AND COMMITTEE OF THE * * *

GENTLEMEN,—Your immediate attention is respectfully solicited to the following statement :—

In accordance with the general plan of the Council of the Society of Arts for the present year, a Committee and Board of Examiners have been formed for this locality, to assist in carrying out the Examination scheme of the Society. The operations of this Committee and Board will extend to all Institutions in and around Leeds who may wish to avail themselves of their aid, and, indeed, to any others in Yorkshire that may desire to send Candidates to Leeds for Examination.

According to the "Examination Programme" of the Society, it will be required of Candidates that they undergo a "Previous Examination."

1st. To test their Handwriting and Spelling.

2nd. To test their knowledge of English Grammar and Composition.

3rd. To test their knowledge of the Elementary Rules of Arithmetic, including the Rule of Three.

4th. To test their knowledge of the *Special Subjects* in which they desire to be examined by the Society's Board of Examiners.

Candidates who satisfy the Local Examiners at the "Previous Examination" as to their acquaintance with the simple and elementary branches of study referred to, and also as to their knowledge of the *Special Subjects* upon which they desire to be examined, are regarded as "Passed Candidates," and are therefore eligible to undergo the "Final Examination," which will be conducted under the supervision of the same Local Board, but by means of written papers sent from the Society of Arts.

The previous Examinations will take place at Leeds, on Tuesday, April 6th, and Wednesday, April 7th, beginning each day at 10 a.m.

Persons who purpose to come forward as Candidates, will please to signify their intentions to the Committee, if possible, on or before Saturday, March 27th, and, at the very latest, on Wednesday, March 31st.

The Report of the Board of Examiners on the "Previous Examinations" will be laid before the Local Committee on Friday, April 9th, immediately after which the Candidates will severally be informed of the decision of the Committee on their eligibility. The precise date of the "Final Examination" will at the same time be communicated to each Candidate.

The following is the list of Local Examiners, with the Department assigned to each:—

Reading, Writing, Arithmetic, English Grammar, and Composition..	Mr. H. E. Kincaid, M.A., Head Master of the Leeds Mechanics' Institution and Literary Society's Schools. Mr. A. Oliver, Principal of Woodhouse Academy.
Geography, English Literature, and History.....	Mr. A. Oliver.
Mathematics and Book-keeping	Rev. Henry E. Phillips, B.A., Incumbent of Christ Church. Mr. H. E. Kincaid, M.A.
Chemistry	Mr. Thos. Scattergood, Surgeon, and Lecturer on Chemistry at the Leeds School of Medicine.
Botany	J. D. Heaton, Esq., M.D. Lond., late Lecturer on Botany at the Leeds School of Medicine.
Physics	Mr. Alexander M'Ivor, Certified by the Government Department of Science and Art as a Teacher of Physical Science.
Physiology	Mr. Claude Wheelhouse, Surgeon, and Lecturer on Anatomy and Physiology at the Leeds School of Medicine.
Political and Social Economy.....	Mr. James Hole, Hon. Sec. Yorkshire Union of Mechanics' Institutes.
Classics and Roman History	Rev. C. E. Moberly, M.A., Second Master, Leeds Free Grammar School.
French	Mons. Brocard, Teacher of French Language and Literature.
German	Herr Reunert, Teacher of German Language and Literature.
Drawing	Mr. John White, Head Master, Leeds School of Art. Mr. Charles Ryan, Assistant Master, Leeds School of Art.

N.B. No Candidate will be examined in more than three *special* subjects.

EDWD. BAINES, Chairman *pro tem*.
ALEX. M'IVOR, Secretary.

FIFTEENTH ORDINARY MEETING.

WEDNESDAY, MARCH 17, 1858.

The Fifteenth Ordinary Meeting of the One Hundred and Fourth Session, was held on Wed-

nesday, the 17th inst., Sir Thomas Phillips, Member of the Council, in the chair.

The following Candidates were balloted for and duly elected members of the Society:—

Fenn, Joseph	Hedley, Thos. Abercrombie
Healey, Elkanah	Roney, Sir Cusack
Sheppard, T. B. W.	

The Paper read was:—

ON THE PAST AND PRESENT OF FRENCH AGRICULTURE.

By F. R. DE LA TREHONNAIS.

The proud position which English agriculture has taken amidst the arts which, by their excellence, characterise the civilisation of our age, has necessarily drawn upon its progress and development for the last fifty years the attention of the whole world. Improved means of communication have induced foreigners to come and visit English farmsteads and agricultural exhibitions, whilst international shows have enabled still greater numbers to gaze upon the wonders of English industry, by placing in conspicuous evidence the excellence of England's breeds of cattle, and the singularly effective ingenuity of her agricultural implements. There is in progress this providential economy, that its diffusion obeys similar laws to those which regulate the transmission of light, sound, and heat. Like these natural phenomena, progress will radiate, expand from the centre of its existence, and diffuse itself all around, in spite of routine and opposition, until a perfect equilibrium is established. Hence the eagerness manifested by other communities, some immediate neighbours to this island, some dwelling at its very antipodes, to come and copy English systems of practical husbandry, study English experience in every branch of agricultural economy, and obtain English cattle, implements and seeds, that they may in their turn, with all the advantages of more favourable climates, reap the benefits of improved practice based upon sound theory.

This intercourse in the case of France, whose agriculture is the subject of my paper, fostered by the close proximity of our respective shores, rendered more intimate by the links of a political, and, I trust, national and popular alliance, and made still more practicable by means of the international shows which have lately taken place—this intercourse, I say, has naturally excited among Englishmen a greater interest in the agricultural status of France than in that of any other nation.

A few years ago a gifted French economist, M. Leonce de Lavergne, wrote a book on the agricultural economy of Great Britain, in which, in order to bring out the facts upon which he based his arguments in a more conspicuous manner, he compared statistical and economical statements about the condition of England and France, and it must be admitted that the inferiority of the latter, in every branch of her agricultural economy, was most forcibly established. My object this evening is not exactly to impugn that position, but rather to explain and qualify it, and then to show that, after all, there are, in the past, and especially in the present state of French agriculture, many causes of pride and honour, which give it a place, not unworthy the greatness which France has gained in other arts and achievements, and which, I hope, continuing to develop themselves with that steadiness and persevering energy which are the true characteristics of progress, will, ultimately, not in antagonism, but in noble rivalry with English excellence and perfection, reach at length that desirable degree of efficiency and productiveness which is the surest and safest element of national independence and prosperity.

French agriculture has not always stood in so great an inferiority to that of England, for there

was a time when it was so flourishing that the supply of grain to England was mainly dependent upon French harvests. History tells us that up to the 16th century, England and Scotland were so far behind in industrial and agricultural pursuits, that Francis I. had to send over to this country two artisans of each trade, and several sets of agricultural implements. Even in the time of Queen Elizabeth, England was almost exclusively dependant upon Belgium and Flanders for her supply of vegetables, and it was from these provinces that she obtained her first notions of improved husbandry.

A glance at the history of England up to that period is sufficient to account for this comparative inferiority. War, especially civil war, and agriculture have two widely different objects; the one is production, the other destruction; and it is obvious enough that, as long as intestine wars raged over this country, a state of barbarism in arts, as well as in manners, must have been the lamentable and inevitable result.

To the same cause, in a great measure, and to others, to which I shall presently allude, must be ascribed the great neglect into which French agriculture was suffered to lapse, from the commencement of the seventeenth century up to within the last few years, when unmistakable symptoms of revival have manifested themselves, with a degree of energy and earnestness which bids fair for a speedy regeneration.

In order to measure, as it were, the extent of the decline of French agriculture, and to form a correct estimate of the progress that has been lately made, I will describe, in the first place, what was the status of agricultural practice in the sixteenth century, and compare it with that of modern times. I conceive that by so doing I shall best succeed in giving a clear and comprehensive idea of the history of agriculture in France for the last three hundred years.

I have selected the sixteenth century as a starting point for our inquiries, not only because that time was, in my opinion, the most prosperous and flourishing period of the history of French agriculture, but because this is the earliest date when there is any record of agricultural science and practice to be found in the annals of French political economy. I allude especially to the remarkable work of Olivier de Serres, entitled "The Theatre of Agriculture," which gives, in a full and clear exposition, a complete account of agricultural practices and notions in his time.

The perusal of this curious work, which is very little known, although often spoken of, fills one with astonishment, not to say humiliation for our present boastful age.

It is the fashion now-a-days to expound alleged new ideas and theories, to point to practices, the efficacy of which is everywhere recognised and admired, as the discoveries of our times. Subjects are daily discussed, conclusions are drawn in public meetings and newspaper leaders, as if they had burst for the first time upon public attention. We frequently have to listen to learned disquisitions upon the rotation of crops; the so-called theory, and, still more so, the practice of drainage; the various modes and means of preparing the land; the selection of seeds; the necessity or, at all events, the usefulness of meteorological observations; the equalisation of weights and measures; the duties of employers towards their labourers; the principles of leases; the economy of the management of landed property, &c. We are wont to engross our minds with the consideration of all these topics, and those who undertake to lecture us upon them seem to handle those subjects as if they were presented for the first time to the attention of mankind, as if they were new questions only just arising from the force of the progressive development and wants of our civilisation. And yet, those who love to dwell on the past, those who are not dismayed by the forbidding aspect of musty books, and feel more interest in the investigation of historical lore than in the stale and hackneyed topics of modern

literature, know well that all these subjects were handled and discussed by our forefathers with a degree of knowledge and experience which brings the blush to our cheeks, and proves that, with all the wondrous advantages we possess, the application of a new and powerful motive power to farming operations, our improved implements, and especially the truly marvellous discoveries of science, the progress we have made in the practice of agriculture is comparatively very slight indeed,—and, if we except the application of steam, which is far from general even in this country, where there are still some advocates of the flail to be found, the improvement of agricultural herds of animals, and the invention of a few really useful implements, the present state of agriculture in Europe can scarcely be said to have participated in the immense stride accomplished by those other branches of the civilisation of the world which chiefly depend upon the ingenuity of men. This I do not mean as a reproach to modern agriculturists, for that stationary position which looks so much like an anomaly in the midst of the general progress, can easily be accounted for. Agriculture being the most ancient, as it is the most necessary of human arts, is naturally the topic which has most engrossed the attention of mankind from the earliest times of the world's existence, therefore the amount of agricultural experience and knowledge recorded and handed down from generation to generation, naturally greatly exceeds that which the tradition and history of other arts can bring forward as the incentives and means to their progress.

During the feudal tyranny of the middle ages, French agriculture, in common with that of all other countries regulated by the same social laws, participated in an especial manner in the frightful disasters of that turbulent period. The slave-like condition of the peasantry, the uncertainty of their ever reaping the fruit of their labour and industry, their constant withdrawal from their fields to go and fight their restless lords' battles, the lawlessness of armed bands, ever ready for pillage and destruction, the division of the surface of the land into many petty states, under rulers, absolute, and in most cases tyrannical, to an excess unparalleled in the annals of history—chieftains acknowledging no other law but the whims of their unbridled passions, and ever making inroads into the territories of their neighbours with fire and sword, all these untoward characteristic circumstances of the long and disastrous period of our mediæval history, made it a matter of absolute impossibility that even the faintest gleam of progress in agriculture should manifest itself amidst the general darkness, that hung like a sinister cloud, over the annals of the first half of that period. It was only when the Kings of France, from the time of Lewis XI., began to put a curb upon their vassal lords, and gradually relieved the exhausted population from the incubus of feudal serfdom, that agricultural prosperity sprang from the kindly soil of France, and began to shed over all classes of society, revived with the aspirations of comparative freedom, the blessings of plentiful and secure harvests.

Under Louis XII. the grinding taxes which had exclusively been laid upon the tillers of the soil, were greatly relaxed. Under that king so justly surnamed the father of the people, agriculture began to flourish; and had it not been for the disastrous and continued foreign and religious civil wars of his successor, Francis the First, no doubt but the national prosperity of France would have enabled her to weather with less damage than she did, the frightful trials of the 18th century.

Under Henry the IV. French agriculture seems to have reached the highest point of prosperity of which its history can boast. Never in the annals of France had the population been so near the realization of that good king's celebrated wish, that every one of his subjects should be enabled to boil a fowl for his dinner. The results of an enlightened commercial policy, granting to agriculture that freedom without which it cannot

prosper, were manifest in the increase of production, which ever brings in its train increase of population. The owners of the land were wont to reside in their chateaux, and by bestowing a large share of their attention on the sources of their incomes, gave rise to a friendly intercourse between themselves, their tenants and labourers, which tended to elevate the latter, and enlighten the principles which guided their pursuits. It was in that happy reign that lived Oliver de Serres, and the immortal work which he wrote upon the agricultural status of his time will remain to the end of ages the worthy monument of a period of prosperity, which cannot be said to have been equalled even in our time.

But, alas! that prosperity was not to last; the hand of an assassin put an end to the life of the good king under whose rule it had been fostered and protected, and with his blood it seems as if the tide of progress and civilisation, peace, and religious tolerance, had ebbed from the kingdom of France, and left it the desolate arena of dissensions, and plunder, exactions and massacres, lawlessness, dire centralization and famine.

The limits of this paper do not allow me to dwell upon the political influence of historical events, or on the ruin of agriculture during the fatal period extending over the 17th and 18th centuries, further than to point out the bias of Richelieu's policy under Louis XIII. He favoured industry and commerce at the expense of agriculture, which he held in utter contempt, not to say enmity. But however disastrous that exclusive policy might have been, it was reserved to the centralisation effected by Louis XIV., in order to gratify that inextinguishable thirst for pompous display which devoured him and all those whom he drew around him, to strike the heaviest blow to agriculture, as an industrial pursuit and a national interest. This centralization, which gathered around the throne a crowd of courtiers anxious for the sunshine of courtly favours, estranged the nobility from the tillers of the soil, and reduced the latter to that degraded state of misery, ignorance, and inaccessibility to improvement from which they have scarcely begun, even now, to emerge. Under Louis XVI. a new era dawned upon France, exhausted by the folly and disasters of the two preceding reigns. Partly owing to the enlightened mind and the personal virtues of that unfortunate monarch, so effectually seconded by his minister Turgot, partly from the pressure of the new ideas, which the freethinking and infidel philosophy of the 18th century had diffused throughout society, great reforms were actually made and still greater ones were planned. These improvements in the condition of the French people soon imparted to agriculture a new life, when unfortunately the hurricane of the French revolution, and the imperial wars that followed, blew over the land, scattered under its blast the last elements of progress that remained, and threatened to bring back the French people to a state of utter barbarism, by destroying all the bonds which hold communities together—charity, benevolence, and Christianity.

Under the first Napoleon, the drain of able-bodied men was so great, that agricultural labour was almost exclusively left to the feeble hands of women and old men. Even now, although several generations have intervened, the deficiency of male labour is still lamentably apparent, and all travellers, through the eastern provinces of France especially, can testify to the fact that there are still more women than men to be seen in the fields.

Since that period a steady but very slow progress has been accomplished, although for many years it was scarcely perceptible. I shall presently examine the various causes which have been assigned for this stagnation of agricultural progress. These causes are many and serious, and as, after all, their investigation is more immediately interesting and useful as it may tend to their removal, than a lengthened disquisition on the past history of

agriculture, however alluring and pleasant this might be, I will now give a rapid sketch of what the notions and practices of agriculture were in the time of Henry IV., and devote the rest of my paper to its present state and future prospects.

Among the general notions by which agricultural operations were guided and determined in olden times, one of the most strange, and, to us, most contemptible, was the singularly scrupulous attention paid by the agriculturists of that time to the influence of the heavenly bodies, and especially to that of the moon. This superstition has, in a great measure, disappeared from France, but at the time when Oliver de Serres wrote his book, although he faintly ridicules it himself, and especially states that no great confidence should be given to astrological prognostics, yet he appears to be under the sway of the general belief in that influence, and even lays down rules for the observance of certain periods of lunar phases, in respect to field operations. The origin of this superstition is, no doubt, to be traced to the influence of our planet's satellite upon the meteorological phenomena of our atmosphere—that influence had been remarked in times of the remotest antiquity, and the observing experience of generations deprived of the light of science, naturally allowed it to degenerate into an absurd superstition. But it so happened that these prognostications, which in one district were deemed favourable for a peculiar operation, were looked upon as forbidding it in another. It had been enough for a man to observe that under a certain position of the moon such-and-such an operation had succeeded or failed, to lay it down as a rule that under similar accidents the same result must accrue,—*Post hoc, propter hoc*, being, but too often a logical axiom among the ignorant. In our times many superstitious prejudices exist, no doubt, but I am not aware that they exercise any degree of influence over the practice of modern agriculturists. These ideas, although indicating the status of scientific knowledge in those remote times, are not entitled to much consideration, for the rules by which astrological prognostics were applied to agriculture were at complete variance with one another in different districts, and even in neighbouring parishes. These rules were embodied in rhymes, in order to be more easily preserved by tradition, and are remarkable only for their quaint absurdity; not so with the other axioms which we find in the popular languages of all nations, in the shape of short, pithy rhymes, which, handed down from generation to generation, seemed the sole vehicle for the store of practical knowledge which, by means of this oral tradition, was preserved to posterity. In our time we have cheap books and a cheap press, but before the invention of the art of printing, and even long after, these popular proverbs were the only practical records of the world's experience in agriculture. I say practical, for the works of Columella, Virgil, Pliny, Palladius, &c., were utterly unknown, even through the names of their authors, to the mass of the population, and especially to that portion immediately interested in the subject of which they treated. I wish time allowed me to quote here a few of the proverbs with which the work of Oliver de Serres is so abundantly interspersed. We should find in them a quaint but thorough record of acute and practical observations and maxims, which by their wisdom would corroborate many axioms and principles laid down as new discoveries in the practice of modern agriculture.

That most ancient implement, the plough, seems to have engaged a large share of ingenuity at that time. The necessity of thorough pulverisation, subsoiling, the desideratum of the spade-like effect of the plough upon the land, were fully recognised, and we have the description of a roller, not unlike Mr. Crosskill's, which I am sorry to state is now completely unknown in France; indeed, if we compare the common implements of modern French agriculture, that is, those which are used by the

bulk of the peasantry, with those which seem to have been in use in the 16th century, the latter must appear vastly superior. The description of this roller, as given by Oliver de Serres, deserves a translation:—

“From the labour of men engaged in that operation (*viz.*, the pulverisation of the soil) great expense must ensue, on account of the time it takes. To spare that expense, an instrument has been invented of so good service, that by means of it a single man, with one or two beasts, moving it through a field, breaks more clods than ten men with spades and clubs would do. It is a large rolling harrow, composed of two cylinders or rollers as large as the cylinder of a weaver's loom, and covered with strong iron spikes, which, by the movement of the rollers, pass over the clods and crush them entirely. The weight of this harrow must be regulated by its intended effect, so that an adequate pressure may be made in order effectually to pulverise the soil.”

This looks very much like a most happy combination of the harrow, clod crusher, and roller, and is, in fact, not unlike what is called in England the Norwegian harrow. I know not whether it is still in use in any remote part of France. All I can say is, that I have never seen or heard of it. The heavy plough, with wheels, drawn by four, five, or six beasts, the light plough, without wheels, and drawn by two beasts only, the double mould board, the subsoil ploughs, &c., were all in use, and considerable discussion seems to have existed about the respective merits of using horses or oxen, which shows that that question has not advanced a single jot since that time, for discussion about this point is still rife in France, and fills no inconsiderable space in agricultural periodicals and newspapers.

The equalisation of weights and measures, now so happily realised in France, and still a theme of discussion in this country, was considered in those times a desideratum of great importance. I am obliged, through want of time, but much to my regret, merely to allude to all these interesting topics, and to confine myself to the bare mention of them, in order to show what were the ideas of agriculturists, and to offer a term of comparison for the appreciation of the progress that has been made. Another great question, which although so generally practised in this country, yet is still a theme of many animated debates, I mean land drainage, appears to have been as fully appreciated in those times as in our own, and much more extensively practised than it is now in France. The means employed were, indeed, somewhat different, but the principles from which the practice is deduced were as fully known and understood as they are now. Tiles do not seem to have been known; instead of them, thorns, brambles, and even straw were recommended—a mode still in use even in England, where I have heard it strongly upheld by a man who is deservedly looked upon as a teacher in agricultural practice. Even the Keythorpe system is alluded to in De Serres' work, when he speaks of the difficulties presented by the heterogeneous nature of the subsoil.

The hoeing of rising crops, the frequent turning of the soil, the careful extirpation of weeds, the ploughing of land immediately after the harvest, especially when intended for bare fallow, the cultivation of green crops, and the good effect of their being ploughed into the soil, the great superiority of spade cultivation over any other, the importance of quick-ploughing of the land, in order to profit by favourable seasons, by means of changes of oxen, so that no delay should ensue from resting-time,—(a desideratum towards the attainment of which the efforts of our modern agricultural engineers are now energetically devoted, by the adaptation of steam-power to the cultivation of the soil), &c., in fact, all the most interesting and practical questions bearing upon agricultural progress were fully known and appreciated, to such a degree, that, were it not for several advantages we have lately gained from the discoveries of science, the re-

markable work in which all of them are expounded might most reasonably become a text-book for practical agricultural students, even in this country.

As regards the practices of modern agriculturists in France, if we except a few spirited land proprietors, the bulk of the tillers of the soil are far more ignorant than they appear to have been three hundred years ago; for, indeed,—although no difference can be perceived in their modes of carrying on the leading operations of husbandry, such as the preparation of the soil, manuring, sowing, and harvesting, in which respects they may be said to have remained stationary,—they are infinitely behind in the general management of the farms, as regards the economy of the details, such as the care of manure-heaps, the construction of farm buildings, the breeding and care of stock, the preservation of produce, the economy of labour, and especially the theory and practice of drainage, the very name of which is still a word without any meaning with the majority of the French peasants.

With this rapid and incomplete sketch I will now dismiss the past. The present, with its stern actuality, its anomalous phenomena, and its immediate importance, has much greater claims upon our attention. I will therefore devote the remainder of the time allotted to the reading of my paper to the present state of French agriculture.

One of the greatest economists of modern times, one who may be called the father of political economy—Malthus, laid it down as a rule that the increase or decrease of population was exactly in the same ratio as the increase or decrease of the production of food.

The history of the last ten years throughout Europe affords a sinister illustration of that principle.

All at once, without any warning, a mysterious disease fell like a plague upon the potato crops of Europe, the stalks withered and blackened as if an avenging flame had passed over them, and the precious tubers, relied upon as the sole sustenance of millions of our fellow-creatures, rotted in the ground, and became a mass of putrid decomposition that even poisoned the air. It was the most awful visitation which our modern times have witnessed. In Ireland alone, one million human beings were swept from the land by the awful stroke of famine, and two millions more hastened away from the shores of that desolated island from sheer want of food, and emigrated to the United States and elsewhere. Thus a portion of this prosperous empire exhibited, within the affrighted recollections of all of us, the lamentable spectacle of a wholesale destruction of human beings from hunger, a calamity we thought only possible in remote ages of barbarism, times of savage ignorance, and impotence.

Here, then, we have an appalling instance of a decrease of population being caused by a deficiency in the supply of food. A close examination of similar facts throughout history, especially since the comparatively modern period, when the census became a regular operation in all the states in Europe, will show that there is no instance of decrease of population in any country, that is not directly traceable to a decrease in the supply of food.

Wars and epidemics may, it is true, exercise a marked influence upon the population of a country, but these causes of mortality are nothing when compared with insufficiency of food supplies. Indeed, when viewing the phenomena of the social economy of nations from this light, when measuring the deep influence which the supply of bread and meat exercises over communities, how it sways their moral* and material status, how the progress and grandeur of empires oscillate with the fluctuations in the prices of food, and how civilisation itself, with its lofty monuments of arts, wisdom, and liberty, hangs trembling in the fickle balance of plenty or scarcity, it makes the mind shudder with inquietude and terror, and causes reflecting men to turn with increased

* It is well known that crime is much more rife when food is dear than when it is cheap.

solicitude and earnestness towards the progress of agriculture, which is so immediately and momentously linked with the progress of our race.

If, then, the movement of the population of a country be a reliable criterion of its agricultural production, we have only to look at the statistics of the population of France for the last few years, and we shall then form a correct estimate of the capabilities of her agriculture for the production of food.

Anyone looking at the geographical position of France—her favourable climate—the natural fertility of her soil—the happy variety of her surface, presenting every accident of the earth's crust; mountains and plains, gentle hills and rich valleys, broad streams intersecting its length and breadth, the genial warmth of the south combined with the moist temperature of the north, rapid germination of seeds, early maturity of harvests, uniformity of seasons, &c., &c., would naturally think that such a country was capable of supporting a very large population, and that the only evil attached to such prosperous and favourable circumstances, would be an excess of population, which would engender the usual concomitant scourges of epidemics, pauperism or emigration on a wholesale scale. Alas! it is the very reverse, which is now my grievous duty to describe.

A short time since, a powerful organ of the English press, and a celebrated Scotch review, raised a cry that France was degenerating and getting lower and lower in the scale of the human race. These statements were read with astonishment, and in many cases, no doubt, with disbelief, and yet the facts from which those conclusions were deduced are but too true. The census of 1856, in France, showed with the brutal—but plain and unvarnished logic of figures—that, whilst in every country in Europe population was steadily increasing, France exhibited a lamentable decrease, for during the years 1854 and 1855, the number of deaths greatly exceeded that of births.

Superficial writers might, indeed, naturally infer from such a phenomenon, that the French race had reached a period of degeneracy and impotency, but the cause lies elsewhere, for I will show presently that the number of marriages had also sensibly decreased ever since 1850, thus accounting, in a certain measure, for the decrease of the population. The fact of this extraordinary phenomenon cannot be ascribed to any other cause but insufficiency in the supply of food. The high prices which, up to the present time, have prevailed in Europe ever since 1853, connected with the Russian war, which drained the country of money and men, paralyzed, in a sensible degree, agricultural operations; and French agriculture, deprived of capital, as I will presently show, destitute of that improved machinery, which goes far to supply the lack of hand labour, was wholly unprepared for this sudden call of active men which depopulated her villages and for that drain of capital, which was swallowed up to an untold degree immediately by the popular Government loans, and indirectly, but not less fatally, by the enormous sums of money spent in the purchase of foreign supplies. To these causes we must add the unfavourable temperature of those eventful years, which, in undrained land and impoverished soil, fatally reduced the yield of harvests.

But, however satisfactorily we may account for this deficiency in the supply of food during the last five years in France, this does not explain why other countries, which, during the same period, were placed in precisely similar circumstances, did not exhibit the same retrograding symptoms in their prosperity, for, on the contrary, in spite of these adverse circumstances which told with such remarkable severity in France, they steadily persevered in their onward career of progress and prosperity. But, in order to obtain a still more convincing proof that the cause of the slow increase of population in France is directly traceable to the insufficiency in the supply of food from the low status

of agriculture, let us examine the statistics for the last 50 years.*

In 1790, from a census, decreed by the Constituent Assembly, the population of France was found to be 26 millions and a-half; 25 years afterwards, in 1815, it was most likely 29 millions and a half, which gives an increase of three millions—notwithstanding the frightful wars that raged during that whole period. Thirty years after, in 1846, the population had reached 35,400,000, increase, six millions; ten years after, in 1856, it was only 36 millions, which gives an increase of only 600,000 souls.

From the foregoing data it will be seen that, during the revolutionary and imperial era, population increased at the rate of 120,000 per annum; during the monarchical period which ensued, at the rate of 200,000; and, during the ten years which have elapsed since 1846, the average is only 60,000. I say, *average*, for ever since 1850 the proportion has been still less. In 1849, immediately after the revolution, the disquietude and stagnation into which all the interests of the French people, and especially that of agriculture, were suddenly thrown by that fatal event, were made manifest by a sudden decrease in the number of births, which exceeded that of deaths by only 13,000, notwithstanding the plentiful harvest of 1848—which, however, barely sufficed to fill up the deficiency caused by the famine of 1846-47. In 1850, a reaction took place; confidence was restored to a certain degree; the violent scenes exhibited by an unhinged society had ceased; the population, comparatively less disturbed, returned to their labour; the production of food increased, and with it the population, which, in that year, showed a surplus of 187,000 births. In 1851, 1852, and 1853, however, the downward progression began; in 1852 the surplus of births, which, in 1845, was 237,000, came down to 154,000; in 1853, to 142,000; but in 1854, that downward movement crossed the line, and appeared on the lower side with a grim surplus of deaths over births of 69,000. The year 1855 exhibited the same mournful phenomenon, although in a lesser degree; the surplus of deaths reached only 37,074. Thus, in two years, while every country in Europe exhibited a comparatively large increase of population, the numbers of the French people had actually diminished by 106,000.

Thus, to resume the picture of this lamentable decadence, I will state that from 1841 to 1846, a period of five years, population in France had increased by 1,170,000; from 1847 to 1851, this increase only reached 383,000; and from 1852 to 1856 only 256,000. Now, before we examine the cause of this phenomenon, let us see what was the relative position of other states as regards population.

In 1851 England was already twice as thickly populated as France at per square mile, and the excess of births over deaths averaged about 360,000 per annum. It is very true that in this country, as M. de Lavergne remarks in his paper upon the census of 1853, published in the *Revue des Deux Mondes*, the production of food supply does not keep pace with the increase of population; that production must, however, be considerable, because on the one hand emigration has greatly diminished, and on the other the importation of food is by no means adequate to the increase of population. It may then be safely inferred, that agricultural prosperity is the very foundation of the colossal power of England, the greatest the world has ever known, not excepting even that of the Romans, who never swayed power over more than 100,000,000 of men, whereas the British empire cannot be less than double that number.

Belgium, whose territory is but one-twentieth of that of France, from 1851 to 1856 increased its population from 4,427,000 to 4,607,000, which gives a surplus of

* For the following digest of statistical tables I am principally indebted to the remarkable articles on population, from the pen of M. Leonce de Lavergne, and lately published in the *Revue des Deux Mondes*.

180,000; at the same rate France should have gained 1,500,000, and, as I have stated, the increase of her population during that period was only 256,000.

In Prussia, where the census is taken every three years, the population increased by nearly one million in six years; at that rate, the increase in France ought to have been two millions.

In Holland, from 1850 to 1856, the population increased by 204,000, at which rate the increase in France should also have been two millions.

The decrease of population in France results from two sources. On the one hand the number of births has diminished; that of deaths has likewise increased. For instance, the number of deaths, which in 1853 had been 296,000, rose in 1854 to 492,000, nearly 200,000 more. It is true France was at war with Russia, but it appears from authentic statistics, from the War-office, that the total loss during the Russian war, both in the army and navy, and from all causes, was only 70,000.

Now let us look at another item of statistics—the number of marriages. This we shall find also decreasing.

In 1850 there were 297,900 marriages.

1851	„	286,884
1852	„	281,460
1853	„	280,689
1854	„	270,906
1855	„	212,773

So the decrease has been following almost a geometrical progression. In 1855, there were 85,127 marriages less than in 1850.

There cannot be any doubt that an increase in the population of a country is a positive element of prosperity, provided the supply of food increases in the same ratio; without that indispensable condition, it is a positive evil. Epidemics and emigration must re-establish the balance, or else the nation must exhaust its financial resources in the purchase of food from foreign countries. Therefore, increase of population is not always a sign of prosperity, and it can be an immediate cause of ruin. If population were to remain at a stand-still, and the resources of the country were to go on increasing, so that the means of each individual should benefit by that increase, this stand-still would be an immense benefit. But statistical science tells us that such positions are merely impossible. For, on the one hand, an abnormal increase of population, without a corresponding increase in the supply of food, is sure to lead to fearful mortality and misery, which, by diminishing the number of marriages and births, soon bring down the number of the inhabitants within the limits of the supply of food; and, on the other hand, the tendency of the human race to multiply itself is so energetic, that, in times of prosperity, that is, when food is cheap and abundant, it requires only 25 years to double its numbers. Therefore, those who might argue that, although the population of France may not be increasing, yet her resources are being rapidly developed, and her material prosperity is the more securely progressing as it is shared by fewer individuals, fall into a grave error, for I will presently show that French agriculture does not produce a sufficient supply of food even for the stationary, if not decreasing, population of France, and I will also prove that her material prosperity, such as it is manifested by great enterprise, and useful public works, bears no comparison with that of her neighbours, with perhaps the exception of Spain and some petty Italian States. But some will no doubt point to the magnificence of Paris, the gigantic embellishments which have been achieved of late years; others may refer to the net of railroads which is being steadily carried all over the country, &c.

Now, let us examine those two symptoms of prosperity. A very few considerations will suffice to show how deceitful they are.

Paris, it is true, has been greatly embellished; its population has increased in a few years by at least 300,000

inhabitants; immense sums of money have been expended in pulling down its narrow streets and rebuilding others; in erecting palaces; making fairy-like parks, and public gardens, &c., but at whose expense? The reply is a forcible one—at the expense of agriculture. The 300,000 additional inhabitants chiefly consist of mechanics and labourers removed from the country. In 1856 alone, the number of labourers, principally masons, who left the department of La Creuse exceeded 50,000, the total population being 287,000. This wholesale emigration represented the sixth part of the inhabitants, and the able-bodied proportion being about 1 to 6, it follows that nearly the whole valid portion of the inhabitants of that department emigrated *en masse*. In the provinces of La Marche and Limousin there are now scarcely any able-bodied men left, and the cultivation of the soil is literally suspended. Add to this centralisation of highly-remunerated labour upon one single part of France, the 500,000 able-bodied men which conscription takes every year to renew the ranks of the army, and you will easily realise the deficiency of agricultural labour that must ensue throughout the land. Then, what an amount of treasure lavished upon Paris alone! whereas so many parts of France are still almost inaccessible from want of agricultural roads; if a due proportion of that money was spent in draining, making roads, and other useful improvements, there might be less splendour, perhaps, but there would be a far greater degree of substantial wealth and prosperity. To give an idea of the enormous disproportion of expenditure for public works in Paris, as compared with the whole of France, it will suffice to state that, in 1855, the whole amount of public money spent in improvements throughout the country was £84,080,000, out of which Paris alone absorbed the enormous sum of £35,080,000, nearly the half of the whole amount. Now about railways. If we examine the relative proportion of miles opened for traffic, we find that in England there are proportionately ten times more than in France. Belgium and Germany exhibit also a large superiority in that respect. But as a last proof that the standstill of the population in France is not attended by an increase of wealth, and especially agricultural wealth, let us examine the official return of food importations for the year 1856, and we shall see whether, with her reduced population, France is able to find in its agricultural resources a sufficient supply of food. But before I give the official figures, allow me to remind you that the population of France is only to that of England as 68 is to 100, whereas her home production of food is only one-third of that in England, Belgium, and Holland, two-thirds of what it is in Germany and Lombardy, and it hardly comes on a par with the less populated and worse governed portions of Europe, such as the Italian peninsula, Spain, and Portugal. The importations of agricultural produce in 1856 were as follows:—

Cereals	£12,120,000
Rice	1,400,000
Dry vegetables, and other farinaceous food	280,000
Cattle	2,240,000
Meat, fresh and salted	320,000
Butter and cheese	440,000
Wine, spirits, and beer	2,160,000
Table fruit	720,000
Olive oil	1,000,000
Silk	9,880,000
Total	£30,560,000

This is important, as it expresses the exact deficiency in the agricultural produce of France for a whole year, and constitutes, after all, the most accurate agricultural statistics. Only calculate what a difference the production of food can make in the wealth of a country; supposing French agriculture to be as prosperous as it is in

England, in Belgium, or in Holland, instead of having to pay foreigners 30 millions of pounds a year, France would be enabled to export double that amount, so that she would realize an annual profit of nearly 100 millions sterling!

This calculation, which gives the measure of what French agriculture could do, alas! gives also that of its shortcomings and poverty. Let us now examine the actual causes which contribute, directly and indirectly to this lamentable inferiority.

Among these causes, the division of property has often been cited as one of the most destructive. For my part, I believe the evil influence of that system is more apparent than real. In the first place, property in France is far less divided in reality than appears from the number of property-tax schedules. The number of schedules, or as they are called, *cotes foncières*, do not represent the number of land proprietors, because there is a schedule for every portion of land owned in a special district. For instance, I own a property in the neighbourhood of Lisieux, in Normandy, which happens to be situated upon the limits of three districts, and I am returned in three schedules for the same estate. In the second place, the average of children in French families does not exceed two and a-half, so matrimonial alliances, especially with the dowry system, go far to reconstitute properties divided by succession. In many cases, an equivalent in money is given to daughters, so the landed property remains to the son. Where there are several heirs to a property, it is also frequently sold and the money divided; such land is either bought whole, and, of course, suffers no division, or, more frequently, is bought by a neighbouring proprietor, near whose property it lies, and thus increases other estates, producing the very reverse of division.

Of course, I do not attempt to deny the advantages of large estates, as regards agricultural prosperity, but I do not think that in France they would be attended with the same advantages as in this country. Extreme division of holdings is certainly a great evil, and a fatal obstacle to agricultural progress, but with the lack of capital among French agriculturists, moderate-sized farms are a positive advantage. With the limited means at their command, French farmers can hardly cultivate what they hold; how could they be expected to succeed better with more extensive holdings? With no drainage, few cattle, no artificial manure, scarcely any sheep, except in districts where little corn is grown, and no capital, farming on a large scale is wholly out of the question. I have just mentioned drainage, cattle, sheep, and artificial manure; let us examine how French agriculture is situated in respect to these life springs of agricultural prosperity.

There are in France no less than 30,000,000 acres that want drainage, and out of that immense surface there are only 86,000 now drained, 20,000 of which belong to one single department, that of Seine and Marne, where some of the best farming in Europe is to be seen.

France possesses about the same number of sheep as England, but the difference of size, weight, early maturity, and quantity of wool, even setting aside the difference in the surface of both countries, establishes an immense superiority for England, which besides breeds and feeds twice as many heads of cattle per acre. As regards artificial manures, I will only state that out of 223,000 tons of guano that were shipped from the Chincha Islands in 1854, 113,000 came to England, 98,000 went to America, and only 5,688 were landed in France. The absurd navigation laws, which allow guano to come to France only in French bottoms must, as a natural result, enhance the price of that precious manure, so that it is dearer in France than any where else. Superphosphate is almost unknown, the only artificial manure employed in any considerable quantities being animal black and poudrette.

The manufacture of agricultural implements, which

in this country has reached such gigantic proportions, scarcely exists as an industry in France. The rude implements used by the peasantry are generally manufactured by village mechanics, from old and unimproved patterns, handed down from generation to generation. The importation of modern implements from England and Belgium, although the duty has been greatly reduced, is next to impossible, from the vexatious formalities exacted by the Custom authorities. Besides, improved agricultural machinery must always remain out of the reach of the French farmer, not only from the almost impossibility of importing it from other countries, but especially from the high price of iron, which is kept up by protective duties to the great detriment of agriculture. The consequence is, that land in France is ill-cultivated, ill-cleansed, ill-sown, ill-reaped, and overrun with weeds, which fester undisturbed amidst meagre crops, one-third of which they destroy by robbing them of their nutriment.

Such, unfortunately, is the prevalent and general state of agriculture in France—and to this state must be ascribed the cause of that deficiency in the production of food which exercises so fatal an influence over the population and prosperity of the country. But I should render myself guilty of partiality and injustice were I to omit to say that in the midst of that degeneracy, there are bright spots, significant symptoms of revival, which bid us hope for a rapid improvement. The late political revolutions have caused many eminent men, whom public duties and honours had called to the capital, to withdraw to the peaceful and soothing scenes of their rural abodes, seeking that *dulce otium* so beautifully sung by Horace in one of his happiest odes. Others, keeping aloof from a government with which they have not only no sympathy, but for which they actually entertain a hostile feeling, have passively withdrawn from active interference in political interests. These men have soon freed themselves from the hold which the gaieties of the Paris world, had once upon their habits and tastes, and, quietly settled in their chateaux, they have applied to the improvement of their patrimony, and the advancement of agricultural progress within the sphere of their influence, the enlightened energies of their spirit, and the savings which a retired and simple country life, enabled them to realise upon their incomes. Ever since the revolution of 1830 this movement has steadily set in. In 1848, that period of excitement, by stirring old party expectations and sympathies, mouldering but not extinguished, checked it for a time, but since the establishment of the empire, all those who have escaped from the fever of speculation or ambition have once more returned to the fields, and the effect has been that the old French society of the Faubourg St. Germain is almost extinct in Paris; in its stead there has sprung up a society of monied men, wealthy to-day, ruined to-morrow, who have brought into the very constitution of their social circles, those reckless and loose principles which operate with an immediate action upon the raising up and the downfall of the fabric of their fortunes. It is a well-known fact that within a radius of 20 miles around Paris, the landed property changes hands every twenty years.

Unfortunately, French landed proprietors as a class are poor in capital, and this disadvantage especially falls upon those who devote themselves to agriculture; hence the slow pace of improvement. This drawback is still increased by the singular notion, that every shilling spent in improvements upon the land is utterly lost. This notion is pretty general through all classes of society in France. It is an undisputed axiom among landed proprietors, that landed property does not return them more than 3 per cent., which is pretty correct, if we consider it only as an investment for capital; but they do not consider that, to that low rate of interest, must of course be added the profits realised by the farmer. It is very obvious that if we consider agriculture as an industrial interest, which it really is, we must allow that it requires a certain outlay, like other manufactures, before it can bring

a return. Experience tells us, that there is no raw material that yields so bountiful a reward as land, when money is liberally and judiciously spent upon its improvement. But, owing to prejudices on the one hand, and the want of capital on the other, the efforts hitherto attempted have been timid, grudgingly made, and, in too many instances, abortive, for want of sufficiency. Nevertheless, the more general attention of land proprietors to their estates, the growing taste for agricultural pursuits among them is one of the happiest symptoms of progress, because it constitutes a practical incentive to that progress among the truly agricultural class, I mean the peasantry, by setting them an example, the only argument that has any hold upon their understanding.

The class of English farmers cannot be said to exist in France. With some few exceptions, in the northern districts and around Paris, the peasantry is not above the class of labourers in England, and by no means so intelligent. Their long possession of the soil, their isolated position which leaves them outside that general movement of civilization only felt within the sphere of centralization, when centralization exists in a community to so great an extent as it does in France, and the narrow limits of their ambition, have hitherto smothered every germ of improvement in their minds or in their material position. Having no capital, they can barely obtain from their little holding enough to pay the rent, and eke out a coarse subsistence for their families. With the surplus of the rye, barley, or buck wheat, which have not been sold to pay the landlord, they knead the dark loaf which forms their staple food; with the wool of their scanty flocks they spin and weave their rude garments; meat they scarcely ever taste. Poverty and the vicissitudes of produce from a soil so ill cultivated, have necessarily engendered among them penurious and miserly habits. What money can be saved from unheard of privations is hoarded up and concealed in old cupboards, and lies totally unproductive. Not even the faintest glimmer of modern commercial policy has yet penetrated into that class, and, generally speaking, they have no idea of credit or bills of exchange. They never avail themselves of the machinery of banks; all their transactions are in hard cash, and not many years ago they did not even know gold. I perfectly remember a farmer, a perfect stranger to me, stopping me once in a country road to ask me if I knew gold, and showing me a few gold coins he had just received in payment at the neighbouring town, evidently with very serious misgivings as to their value. There cannot be any doubt that, even in the present day, there is a vast amount of bullion treasure hidden in France—buried in hiding-places. The singularly successful loans effected by the emperor, at the time of the Crimean war, when, in a few days, and from the lower classes, twenty times the amount wanted was filled up, is a sufficient proof of that lamentable fact. And yet there cannot be any doubt that, in the French peasantry lies the strength of the country. As a body, they are sound and staunch; their vices are no doubt the result of the neglect in which the system of centralization has abandoned them; but their virtues are untouched, and those virtues are of the same stamp as those of the forefathers of our degenerate modern societies—those of the early Romans, who handled, with the most natural transition, the plough and the sword, and who wrought, by their stern virtues, the foundation of that gigantic power which an effeminate posterity let slip from their feeble grasp. The French peasantry are patient, sparing, religious, and highly moral. Conscriptions draw every year into the ranks of the French army at least 400,000 of their robust sons, and a thousand European battle-fields, reddened with their generous blood, have proclaimed, in triumphant and glorious records, how they can die and conquer. Once get the thin edge of progress into their traditions; let a gleam of enlightenment kindle their hard and miserable career with a beam of sunshine; let a little more comfort cheer their

homes; let a more extensive range of ambition widen the sphere of their activity; let a little more capital improve their land; let their commons be divided or alienated to spirited and enterprising agriculturists; let their breeds of cattle be improved by the infusion of better blood; let banks of credit introduce into their trading habits less cumbrous modes of dealing; let them understand the use and value of money, which derives life and production only from quick circulation; let a rational education, suited to their wants and requirements, burst open the stolid crust of blind routine that enslaves them, and the French nation will rise great and powerful from inherent and intrinsic worth and strength, for she possesses in her peasantry, which is the bulk of the population, the moral stuff where-with great and glorious communities are formed.

The higher classes in France, owing to the absolute sway of the government, which buys and sells them with honours, lucrative posts, and a boundless patronage, have little or no influence; those that are honest are generally poor and inactive. The monied class, and what is called the bourgeoisie or trading class, are rotten to the core; they have no religious creed nor principle. Sensuality and selfishness are the two motive powers of their thoughts and actions, the rankest infidelity unbridles in them the brutish appetites of human nature; and the riches they acquire only serve to pander to their vices. Alone, the rural population has preserved those primitive virtues of innocence and morality which are the real strength of a nation, and without which it must decline and fall, and even totally disappear from among the ranks of the human race.

But, I may be asked, has the French government done nothing to revive agriculture? There is a minister of agriculture; there is a large and influential staff of agricultural inspectors; there are innumerable government model farms, agricultural colleges, breeding establishments, where the best English cattle are kept; there are shows, both local and general; there have even been some called universal and international. We have heard of a vote of 4,000,000 sterling for drainage; there is a bank of *crédit foncier*; very large sums of money are spent from the consolidated funds and from local resources, in liberal prizes and encouragement; surely all these must have exerted a considerable influence upon French agriculture, and given an extraordinary impetus to its progress.

We have all heard of—and some of my audience, perhaps, have seen—a strange and somewhat awful experiment performed by means of a galvanic pile upon a corpse. A wire is put in communication with the spinal marrow, and life, movement, and action are restored to the muscles; the corpse will stand erect, open its eyes, move its arms and legs; its livid lips will quiver as if they were going to speak, and to all appearances death has been conquered, and the corpse lives; but only interrupt the mysterious current from the pile, and the lustre of the eyes will vanish, the arm will fall inert; the jaw will hang, the eyelids will close, and the ghastly corpse will fall to the ground, once more a helpless mass, on the verge of decomposition. In like manner the action of the French Government props up a show of activity, a show of vitality, in the French agricultural interest, but it exists only on the surface. Who are those who exhibit at the shows? they are only a few amateur fancy farmers, and the specimens they exhibit very often constitute the totality of the stock they have on their farm, and are by no means a sample of the agriculture of their districts. The farmers, with very few exceptions, are not only not exhibitors, but not even visitors. The schools have been productive of very little good. As farms, they have been lamentable failures, and the peasants point to them as instances of the folly of modern ideas; in fact they do not pay, and as model farms, they ought to pay. The *Crédit Foncier* is only a loan establishment upon mortgages, a gigantic pawn-broker's shop, too intricate and formal in its working to

be of any real utility. As to the grant of 4,000,000 sterling for drainage purposes, it exists only upon paper, not a sou of it has yet been applied, or I verily believe even asked for. The fact is, that the government interferes too much with agriculture; they assume too absolutely the guidance of progress, but they only turn within a vicious circle, fancying they go a great pace and accomplish a long journey, when, in reality, they only turn within a ring. Nothing is left to private enterprise, and, on the contrary, if anything be attempted from private initiative it is immediately snubbed and put down. The result is, that so much dependence is placed upon government initiative, that, wherever the immediate action of the state is not exerted, no institution, no society, no common interest can arise from local necessities and wants, and that individual energy which local necessities invariably start into existence, when the action of society is unfettered and independent, lies dormant and inactive, because a universal state tutelage enthral the whole community in indolence and careless indifference. All this show of vitality is therefore a sham, the result of a temporary galvanic current. Let the state cease to interfere, and all this brilliant activity will vanish, and the poor agriculture of France will appear what it really is, an inert corpse, scarcely retaining the spark of life. And how can it be otherwise? It bears the huge incubus of a property-tax amounting to 20 per cent. of its gross produce. All the raw materials necessary to its operations are saddled with a heavy import duty, just to favour a few ironmasters and manufacturers, who fatten upon this exclusive and partial protection. In order to favour navigation, guano is made dearer than anywhere else; salt is the object of a monopoly which renders its use an impossibility, although a portion of the impost is remitted for agricultural purposes, yet, the formalities to go through, and the expense of rendering it unfit for any other use, are such, that it would be cheaper to pay the full price of the monopoly. Agricultural implements cannot be obtained, except at a ruinous expense. Such, then, are the stumbling-blocks which a rational government ought to remove; and these once removed, private enterprise and institutions ought to be encouraged, and the dangerous interference of government gradually withdrawn. For the experience of history, particularly in England, convinces us that, the less the government of a country interferes with the independence of commercial and industrial interests, the more they prosper, and the firmer is the base upon which their structure is built.

But, however desirable independence of individual action may be, generally speaking, there is one point in which the direct influence of the State may be brought to bear with great advantage, and that is—the application of the power of public means to the realization of great enterprises, entailing, by their success, a great amount of public advantage. In France, such a course is still more necessary than in any other country. because, as I have stated, the people are accustomed to trust to the Government's action for almost every public and local interest. I principally allude to the draining, enclosure, and cultivation of the commons and Government lands, which, in their present undrained state, are a source of misery, pestilence, and sloth, and which, by means of improvements by no means difficult of execution, might soon be metamorphosed, as by the touch of a magic wand, into plains of unlimited richness and fertility.

The French emperor seems at last to have become aware that, without a greatly improved agriculture, the country he governs cannot become truly powerful, truly great, and truly prosperous, and, which is of vast importance to himself and his dynasty, truly tranquillised and internally settled. He has lately applied to the revival of French agriculture the energetic activity of his mind, and, impatient of the obstacles of routine and

official formalities, he is striving, by personal example, to give a salutary impulse to the whole ponderous and musty fabric. He has purchased whole tracts of waste lands in various parts of the empire, selecting the poorest and the most desolate. His will and his money have trampled down every difficulty, and started fields and farmsteads into existence, where but yesterday nothing was seen but pestilential swamps and barren sands. Having become a farmer, let us hope he will soon feel all the disadvantages under which the farming industry of France is groaning, from restrictive and unfair commercial laws which his power can repeal. Should this be the only good record of his reign, it will suffice to hand down his name to posterity as a benefactor to his country.

And now, in conclusion, allow me, as a matter of duty, to pay a homage in which men of all nations and all classes will readily join, to those eminent Frenchmen who by their researches and profound studies have cast such a vivid light upon the hidden mysteries of nature, especially those of vegetable physiology, and thereby have accomplished so great a progress in the agriculture of the whole world. When I name such men as Dombasle, Gasparin, Payen, and Boussingault, you will admit that, if there is a dark side to French agriculture, it has also a most brilliant obverse. With such names inscribed upon her banner—with such leaders as her sovereign, and spirited landed proprietors—and with such a phalanx as her peasantry, surely French agriculture cannot perish or remain at a stand-still. Her steady tramp is already heard on the arduous path of progress, and, with the indomitable courage and endurance of her sons, and the inexhaustible advantages of her clime, she shall achieve the victory.

DISCUSSION.

Mr. S. SIDNEY said he rejoiced in the circumstances which had induced Monsieur de la Trehonnais to take up his residence in this country, as those interested in agriculture had thus the advantage of listening to his eloquent speeches at their great agricultural meetings, as well as to the very able paper with which they had been favoured that evening. M. de la Trehonnais had drawn a vivid picture of the French peasantry; men labouring industriously day by day throughout the year; living upon the plainest food, and but seldom tasting meat, and yet, in spite of all these sacrifices, they scarcely succeeded in producing a sufficient supply of food to meet the general wants of the nation. That picture scarcely sufficed to give an idea of the agricultural districts of France. One might travel in that country for hundreds of miles—avoiding the large towns—and one would only meet with people of the humblest class. There were but few properties to be seen which could bear comparison with one of the 250 acre farms in this country. The country was dotted over with villages, in which was to be found scarcely a single house of importance except the residence of the government official or the police officer. The general condition of the French agricultural community was that of a large collection of peasant proprietors, with scarcely any capital, cultivating the soil with the most praiseworthy industry but with the smallest amount of skill. The result of this state of things, was, as had been truly represented by M. de la Trehonnais, that agriculture, instead of progressing, had retrograded. Those who had read Arthur Young's description of France before the great revolution could not fail to come to this conclusion. French agriculture laboured under the disadvantages of fiscal laws which seemed to be based upon the principle of discouraging all importation, under the idea that exportation could be carried on to a large extent without involving the necessity of importing anything. He could not help observing that all writers upon French agriculture avoided touching upon the point which he had always

regarded as the greatest impediment in the way of agricultural progress in France; that was the division of landed property. In regarding the condition of agriculture in France, they must take into consideration the fact, that about 60 years ago, a very large portion of land was confiscated and sold at a very cheap rate, and fell into the hands of the peasant cultivators of the soil. Let them conceive what would be the condition of things in this country in the present day, if within a short period the farmers had had an opportunity of acquiring large tracts of land at one-third of its value. But, notwithstanding this, agriculture had declined in the way described by M. de la Trehonnais; and he (Mr. Sidney) thought that this was owing, in a great degree, to the state of the law in France, with respect to the division of property, which he submitted was such as to prevent the development of the agricultural resources of the country. The law was that upon the death of the father the land was to be equally divided amongst the children or successors with the exception of one-third. The consequence of that system was that the land was burdened with mortgages, and the agricultural families were occupied in arranging with the skill of rural Talleyrands, how their plots of land might be kept together in sufficient extent for cultivation. He believed it would be found that 25 acres was beyond the average extent of occupations in France. M. de la Trehonnais had correctly stated that in that country farmers were not to be found like those in England. This he (Mr. Sidney) believed was to be traced to the system of compulsory division of property. In England the landed proprietor provided the necessary farm buildings on his estate, and, in many cases, also furnished the capital for the efficient drainage of the land. It was thus prepared for the tenant farmer, who brought his industry, skill, and intelligence to bear upon it. But the system in France was totally different. In order to have wealthy landlords, they must have comparatively rich tenants. Arthur Young had stated that good farming implied much labour and much capital, but in the French system they had neither of these. Still it was impossible to mix with the working classes of France without being struck with the energy and skill they displayed in their business pursuits, and they were driven into the large towns as being the only real fields for enterprise. In this country a man who invested his money in land, inherited the traditions of the landowner. He was satisfied with a moderate interest for his money. He wished to keep the land for his successors, and hence his desire was to see a flourishing tenantry around him. He did not regard the money expended as lost, although it might not return interest for seven or ten years, because he considered it as an investment for his posterity. But, on the other hand, it was stated that in France the land changed ownership, upon the average, every 20 years. The great landed proprietors of England, men of large capital, had devoted their attention to the improvement of their estates, with the best results to agriculture. He might point to such men as the Bedfords, the Spencers, the Yarboroughs, and a host of others. Those were the men who had expended vast sums upon their estates in providing the necessary materials for the tenants to work upon, and who had done so much for the agriculture of the country. Their successors would inherit the traditions of their fathers, and thus the march of improvement would steadily continue.

Mr. J. J. MECHI could not allow that opportunity to pass without expressing his warm admiration at the comprehensive manner in which this great subject had been treated by his friend, M. de la Trehonnais. He (Mr. Mechi) would hardly venture an opinion as to the causes of the present condition of French agriculture, but he believed that the influences which had tended to injure agriculture in Ireland applied also to France—namely, non-residence, and the absence of a poor-law system. Political influences, no doubt, had something

to do with the matter. In England the possession of land gave a political status, which rendered that description of investment a favourite one. At the same time he (Mr. Mechi) was not competent to give an opinion as to whether such a system could be introduced in France. With regard to roads, he did not know whether the parishes were indictable for neglect in not keeping them in proper repair. There were many practical questions connected with French agriculture into which he would not enter. It must be admitted that the French stood foremost in the ranks of art and science, but he agreed with M. de la Trehonnais that the system of centralisation in France had gone very far to prevent the development of those powers which, as a people, they were known to possess. He was glad to hear that at one period, at least, agriculture was prosperous in France. Any disturbance of the security of property would seriously affect agricultural interests, and one great cause of the progress in this country was the perfect reliance that was placed on our laws to protect the property of every individual, and the security which was universally felt that any capital invested in improvements in land was safe, however distant the prospect of remuneration.

Mr. RAMSAY addressed the meeting at some length upon the general topics treated of in the paper. He could have wished that less space had been devoted to the political economy of the question and that a larger share of attention had been given to the comparison of the agricultural state of the two countries. He agreed with the preceding speaker that much of the evil in connection with agriculture in France was attributable to the absence of the law of primogeniture; and so long as that was wanting they could not look for any great improvement in the agricultural condition of the country. He instituted a comparison between the present state of things in France, in connection with the landed interest, and that which existed in Ireland previous to the operation of the Encumbered Estates Act. Previous to that time, the people actually persisted in starving themselves by the cultivation of potatoes as the staple food, but when the land changed hands, the cultivation of superior crops was introduced, which afforded to the people a higher class of food and better remuneration for their labour. Some such system was required in France before they could look for any marked improvement in the agriculture of that country.

Mr. G. F. WILSON, F.R.S., said, as it was probable some present would wish to look a little farther into the first part of this interesting subject, with reference to the state of agriculture in the 16th century, he would mention that in a book entitled "The Life of Palissy the Potter," written during the time of the Huguenot persecution, some highly interesting remarks, suggestive of improvements in agriculture, would be found. In some material points, they coincided with the improvements that Mr. Mechi and others had urged with so much earnestness and ability in these later days.

Mr. THOMAS SCOTT remarked that the agriculture of France had a peculiar character of its own, and he had hoped that this paper, coming from an eminent practical agriculturist, would have described in detail the development of that peculiar system which France possessed. M. de la Trehonnais concluded his paper by stating that the government was now interfering in agricultural matters, and added the sound political maxim that trade thrived best apart from governmental interference. Nevertheless, for his own part, he thought much was due to the great man who now ruled France, for the steps he had recently taken in reference to the agriculture of that country. He was a man imbued with our English system—not only of agriculture, but also of political economy; and he believed it was well known that the Emperor had a strong desire to relax the stringent fiscal regulations which interfered so much with the prosperity of the commerce of France as well as the advancement of its agricultural interests. But in the

peculiar position in which he was placed, the question arose whether he could do so with safety. The Emperor had promoted agriculture by the exhibitions which had taken place under his auspices, and by the government grant for drainage purposes. Under these circumstances he could not go with M. de la Tréhonnais to the extent of saying that agriculture in France should be still left to its own resources. The late agricultural movements in France had had a favourable effect; but that the Emperor would, in his generation, be able to effect the reform of the entire political as well as agricultural system of the country he thought was extremely chimerical, and to try all at once to engraft our own improvements upon a people who had at present no knowledge of those improvements, and who were, for the most part, ignorant of the implements used in this country, would be altogether out of the question. The shows of cattle, the importation of English implements of agriculture, and the great example of cultivating model farms, which the present Emperor of France had so worthily set, could not but be beneficial to the agriculture of France, which, he thought, must be regarded as the backbone of its national prosperity.

Mr. ELLIOTT thought that M. de la Tréhonnais, in his desire to treat this subject with the strictest impartiality, had scarcely done justice to his countrymen. He thought he had not fairly shown the present physical condition of the French people, as compared with 30 or 40 years ago. The facts as to the diminution of births and marriages, as compared with the increase stated to have occurred in deaths, he thought did not quite prove the conclusions at which M. de la Tréhonnais had arrived. Without any information as to the average length of life, they could not arrive at a just conclusion, for a mere decrease of births and marriages, and an increase in the number of deaths, was not inconsistent with the improved condition of a people. He thought a fair examination into the social condition of France, would show that with a diminution in the number of births, and therefore a diminution of its population, there had been a very marked increase in the quantity of food produced in the country. It might not be as delightful a state of things as we had in this country, where we had an enormous increase of population co-existing with the increase in the production of food and the other material elements of well-doing; but it might happen that the state of France was, apart from political disturbing causes, more safely progressing than our own. The excessive development of population and industry in this country might carry us a little beyond the element of safety. Mr. Elliott proceeded to remark upon the great improvement he had noticed, as the result of close observation, in the *physique* of the French people as compared with former periods. He considered that this had been improved during the last 20 years, to the extent of 25 to 30 per cent. He had particularly noticed this in Paris, and he believed that the same might be said as to the inhabitants of the provinces. But whatever might be the feeling of rivalry between the two countries, it was a great gratification to find, notwithstanding all the unfortunate circumstances in which France had been placed, that there was an immense improvement apparent in the physical condition of the people. They were much better fed and better clothed than formerly, and far from lamenting over the circumstance of the diminution of births, he thought that was one of the means by which the French people would adjust the population to the quantity of food they produced.

Mr. PEARSELL remarked that the extensive colonization now going on amongst the French people was a circumstance worthy of consideration in the discussion of this subject. It sometimes occurred that, in Algeria alone, there were 80,000 troops. The climate was the most beautiful that could be imagined, and the French were invited to colonise there.

Mr. WILLIAM FISHER HOBBS said he had been highly interested by the paper read by his excellent friend, M. de la Tréhonnais. He thought that gentleman, like too many others of his countrymen, out of compliment to the English farmers, had placed the agriculture of France below its true merits. During the last three years his experience and observation of French agriculture had been somewhat considerable; and he must say that the remark which had fallen from previous speakers had placed the agriculture of France in a very unfair position, according to his opinion of it. Indeed, Englishmen visiting France usually only took a very superficial view of the state of the country, and had rarely much opportunity of close observation. Some had also argued upon the extent of the productions of France from the agricultural statistics of that country. He begged to say that they formed no criterion as to the actual produce of the soil. The agriculturist of France was taxed much more heavily than the agriculturist of England, and there were so many schedules used in the collection of the statistics that he did not believe they exhibited the real produce of the land. It had been stated that the character of the agriculture of the country was to be judged from the fact that the land changed ownership every 20 years; in England it was calculated that the land changed hands every 30 years, therefore he did not think that fact went for much. From what he had himself seen of the agriculture of France, there were farms of 800 acres, within 50 miles of Paris, which would bear comparison with any farms in any part of England or Scotland. In fact, he had seen as good practical farming in France as in England. With reference to the agricultural labourers of France, he need only go back to the great gathering at Paris in 1856, to show that in education, manners, and dress, the peasants of all the foreign nations there represented were very much in advance of those of the English peasant. He thought the remarks made were generally too disparaging to French agriculture, inasmuch as he believed that there was no leading feature of improvement in this country which was not speedily taken up in France. In this respect, therefore, he could not agree with M. de la Tréhonnais. He believed the French government had done a vast amount of good for agriculture, and was still doing good, in the distribution over the country of superior breeds of stock for the purpose of propagation, in the establishment of agricultural exhibitions, and in the employment of agricultural machinery, and he had no doubt that country would in a short time reap the benefit of those measures.

The CHAIRMAN said, the time having arrived when the discussion—interesting as it was—must be brought to a close, it was now his pleasing duty to propose a vote of thanks to M. de la Tréhonnais for the very interesting paper he had laid before them. Whether they regarded the matter of the paper or the language in which it had been clothed, he was sure they would all agree that it was a most admirable production. However much they might differ from M. de la Tréhonnais as to the comparative merits of English and French agriculture, and the appearance of the English and French labourers—in spite of all those differences which naturally occurred when a body of men assembled to express their real opinions,—he was sure they would all agree that nothing more frank as an expression of opinion of the condition of his own country could have been presented by a foreign gentleman to an English audience. With regard to the existence of a class of peasant proprietors or peasant cultivators, that was a point of national importance quite equal to any question of fiscal regulations. Another subject to be regarded was the influence which a great manufacturing country exercised upon agriculture. What was it that had led to the agricultural pre-eminence of England? It was not the desire of men to spend money in the improvement of the land or the desire to cultivate land highly, but it was the

knowledge that the development of the productions of the land, where so large a proportion of the community were engaged in manufacturing pursuits would amply repay them for all their expenditure. He believed it was in this respect the agriculture of England and France differed, and notwithstanding what Mr. Hobbs had said as to farm cultivation, and in spite of all they saw on the borders of Flanders, which was as well cultivated as a country could be—yet any one who travelled through Brittany and Normandy as well as some other parts of France, would, in the present day, see that the cultivation was sadly inferior to that in this country. He had seen the plough drawn, not by one horse, or one bullock, but by the one cow that furnished the peasant with his only milk, and that was not an exceptional case; and, where that system prevailed, it was hopeless to look for agricultural excellence. He thought some of the remarks of M. de la Trehonnais had been a little misunderstood. He did not deny many merits on the part of the present ruler of France, but, on the contrary, took encouragement from his measures relative to agriculture. At the same time, M. de la Trehonnais was opposed to the system of centralization—that of the government taking on itself as large a share as possible of the operations of industry. It was to that cause that M. de la Trehonnais attributed a large portion of the defects at present attaching to the French agricultural system.

The vote of thanks having been passed,

M. DE LA TREHONNAIS acknowledged the compliment. He said he was aware that, in a paper confined to a few pages, there must be shortcomings in treating of so large a subject. He quite agreed with the Chairman in approving of the steps taken by the Emperor; the objections he had taken applied not to the Emperor, but to the system of Government. Allusion had been made to the marked physical improvement in the people of Paris. It was to be recollected that half the money for public works was expended in Paris alone, and that brought the artisans and mechanics into that city in great numbers, attracted by the higher rate of wages. But that was no index as to the condition of the people in the provinces. The same gentleman had spoken of the decrease of births as a subject not indicating the failing prosperity of a people. He (M. de la Trehonnais) begged to say that, not only had there been the diminution of births and increase of deaths which he had mentioned, but the average standard of life had also decreased. His friend, Mr. Hobbs, had eulogised the appearance of the French peasantry he saw at the Paris Agricultural Show. It might be that favourite servants were employed on that occasion, but they were not a fair sample of the labouring class in France. He had treated this subject not merely as an agriculturist, but as a political economist. Last summer he made the tour of the south of France, in order to enlighten himself on these subjects, and he had introduced his friend, Mr. Hobbs, to the farm of which he had spoken. He had stated in his paper that in the north of France and in Flanders the farming was as good as that in Great Britain, but those were isolated spots, and bore but a small proportion to the entire area of the cultivated lands of France.

The Secretary announced that on Wednesday evening next, the 24th inst., a paper by Mr. Thomas Allan, "On Electro-motive Machines," would be read.

On the table were exhibited two specimens of wood-carving, by Mr. William Bryer, an amateur.

SOUTH KENSINGTON MUSEUM.

During the week ending 13th March, 1858, the visitors have been as follows:—On Monday, Tuesday, and Satur-

day, free days, 2,894; on Monday and Tuesday, free evenings, 4,700. On the three Students' days (admission to the public 6d.), 770; one Students' evening, Wednesday, 306. Total 8,670.

Colonial Correspondence.

ON THE DESICCATION OF FUEL IN THE MANUFACTURE OF SUGAR.

SIR,—I beg leave to introduce through you, to the consideration of the Society of Arts, a few remarks on a subject of some importance to the tropical manufacture of sugar; I do not claim for them the same meed of approval with which the Society has already honoured some of my papers on kindred subjects, because they have not as yet been reduced to practice, still the data on which they are founded have been so well established, the inferences are apparently so plain, and the interests at stake of such serious gravity, that I am anxious the arrangements proposed should be submitted to a Committee of the Society, and, if considered practicable, either sanctioned by its approval or modified in such a manner as may subserve the interests of the planter.

The desiccation of the crushed cane is in itself a matter of serious moment, in whatever light it may be viewed, whether as regards the loss and inconvenience attendant on its deficiency as fuel or the anxiety and risk of storing it when abundant; its woody portion may be assumed as fully equal in weight to the crop of sugar shipped, say 300,000 tons, and as of this at least one quarter should always be on hand in the shape of dry fuel, ready stored for use, it may be easily supposed how its presence increases the anxiety of the sugar manufacturer, during the dry and windy months, when even the un-reaped canes resemble tinder.

With a view of removing risk and increasing the supply of fuel of a better quality at a lower cost, I venture to submit as follows:—

It is well known to the practical planter, that after the juice has been expressed from the cane by the mill action, the crushed stem or megass, as it is locally styled, is transported, either by an endless web or otherwise, to a covered enclosure, megass-house, or logie, where it is carefully packed and stored, till dry enough to serve as fuel in evaporating the cane juice.

The vessels in which this evaporation is conducted are ranged on a line, for the most part extending variously from 40 to 60 feet in length, and it is found in practice that no fuel can conveniently replace the dried stem or megass, as it is not only produced on the spot, but its long lambent flame envelopes and plays round the evaporators more efficiently than that of any substitute; consequently its preservation is a matter of paramount importance to the planter; and as the quality of the sugar, *ceteris paribus*, depends much on its more or less perfect desiccation, he takes care to provide, so far as his means allow, ample accommodation for its storage. Accordingly, on large estates, the megass-house or logie costs occasionally as much as £1,000 or £1,500 sterling.

It is the pride and care of the planter that, at the close of the crop, his megass houses should be sufficiently stored with fuel to carry him through, at least, six weeks of the ensuing crop; this is the case on most well-conducted estates, but the supply of fuel, although desirable, and, indeed, indispensable, is a constant source of anxiety to the proprietor, and requires incessant vigilance to guard against careless or wilful incendiarism. Once on fire, the burning mass, perhaps some hundred feet in length, endangers or destroys, not only the neighbouring buildings, but, frequently, the growing canes for miles around. Nothing equals the horror of these conflagrations, except, perhaps, the desolation they leave behind. The fuel is also lost at the moment it becomes indispensable, because,

when the fire has passed through standing canes, it is necessary to reap them immediately, or the sugar which they would have otherwise furnished, is lost from the want of wherewithal to evaporate. No money payments can compensate for these losses, and, although the buildings may have been insured, the megass is not, and the immediate loss is aggravated by all the evils attendant on damp fuel, bad sugar, late hours, and discontented labourers.

If such accidents were inevitably connected with the manufacture of sugar, the planter might fold his hands with resignation when they occur; but they are not; and if you will favour me yet a little further with your attention, I shall, I hope, make it clear that it becomes his interest to obviate them as quickly as possible.

In proposing a remedy for such serious evils, it will be necessary, in the first place, to glance briefly at the composition of the sugar cane, and then to apply the data thus obtained to elucidate the desired practical result.

The sugar cane is generally considered as composed of 90 per cent. of juice, and 10 per cent. of woody fibre; this statement is not strictly correct, as it applies only to the merythyllis or internodular portions; the nodes themselves contain at least 17 per cent. of woody fibre, and, indeed, the whole cane, after maturity, very frequently becomes gradually dried up to perfect desiccation: therefore the proportion of fuel in the pressed cane must vary somewhat with the nature of the cane itself. The received opinion, however, that the sugar cane yields 10 per cent. of ligneous matter will form the basis of the present remarks, and, therefore, any variation in the dryness of the pressed cane will be considered as dependent on the varying power of the mills employed.

Let it be assumed, then, that the average quantity of juice expressed by cane mills is 65 per cent., (some mills, few in number, express more, but the average is certainly considerably lower,) then the refuse carried from the mill to the megass house contains not only 10 per cent. of lignine or woody fibre, but 25 per cent. of juice; what, then, becomes of this 25 per cent. of juice thus stored in the megass house or logie? Does it increase the amount of fuel in the crushed stem? Certainly not, for the sugar and water in the cane juice ferment and turn into acetic acid, which not only is in itself incombustible, but prevents combustion in other substances, and till it be fairly dried out the crushed stem is unfit for fuel, this process of drying requires months of storage, and even then is imperfect.

But again, it is found on the other hand, that when the megass, on leaving the mill, is desiccated, by being torn into shreds and exposed to the full ardour of the sun's rays, as is occasionally practised in the months of March and April, when there is any superfluity of labour, it may be used as fuel in the course of a few hours, and its superiority is evident to the most careless observer. Whence, then, this superiority to the ordinary fuel, which has been stored for months under cover? It is clearly due to the proportion of sugar contained in the crushed stem, which, instead of being allowed to ferment, has been converted by the dessicating action of the sun into a dried fuel of most unequivocal power. What has hitherto been exceptional, I would now propose as the rule, employing, instead of the sun's rays, some steadier and more manageable agent. It is not, perhaps, the best use to which the above-mentioned portion of sugar might be turned, but as in the present mode of manufacture its loss may be looked on as certain, the next best thing will be to utilise it on the acknowledged principle that nothing pays so well as refuse turned to profit. What, then, is the real value of this refuse, hitherto worse than thrown away? Is it sufficiently valuable to warrant the planter's incurring any expense in utilising, and if so, what will be his best plan to obtain the end in view?

It has been stated that 25 per cent. is the average amount of cane juice thus consigned to the megass

house in the interstices of the cane stems, but cane juice from a matured plant contains 20 per cent. of crystallisable sugar—(to avoid discussion this per-centage is given as purely approximative—it varies, not only in the same colony, but often in the same field)—therefore, the quantity of sugar actually lost is equal to one-fourth of the whole sugar contained in ripe canes, and represents in its present forlorn state 5 per cent. of good fuel, which by simple precautions might be added to the 10 per cent. of woody fibre already known to exist in the crushed stems or megass. In other words, the quantity of available fuel for evaporating cane juice, or raising steam to crush the canes, might be increased 50 per cent. If the proportions given above be correct, and of that there can be little doubt, it follows, that even in an economical point of view, it would pay to dry the megass as it leaves the mill.

It should ever be borne in mind, while considering this matter, that the desideratum after all, is not so much preparing fuel, as getting rid of the megass houses, whose existence on every estate is a constant source of uneasiness and danger.

To attain this end, there will be no occasion to purchase any extra amount of fuel, if advantage be taken of the waste heat that at present escapes by the chimney. It is not many years since this hitherto lost heat has been applied to raise steam for the crushing power, from boilers hung on the flues beyond the coppers, between them and the chimney stalk. For this purpose the heat formerly wasted has been amply sufficient, and as the draught still enters the chimney at a temperature over 500° Fahrenheit, the remaining heat will, it is assumed, be capable of removing 15 per cent. of the 20 per cent. of moisture remaining in the crushed cane, and thus turning it at once into an available fuel, in other words, with 10lbs. of fuel to evaporate 65lbs. of water. If this be practicable under existing circumstances, it must, *a fortiori*, be more easily accomplished when the combustible has been increased by the 5lbs. additional of sugar which it has been shown the crushed cane stems contained when they left the mill.

It has been already stated that the stems of the canes on leaving the mill are carried continuously, on an endless web, to the megass house, or logie, there to be stored for future use. This endless web it is proposed still to retain, but to employ it in an altered direction, viz., from the mill to the stoke-hole of the furnace, enclosed in a low archway, constructed of whatever may be the most inexpensive materials attainable, such as the walls "en pisé," and the roof of sheet iron. Against the damp megass, as it advances at slow mill speed along the interior of this covered way, should be directed a current of heated air, drawn from the chimney, sufficient to lick up and carry to a suitable exit any amount of moisture it may encounter. The volume of heated air required for this purpose can only be ascertained experimentally, as considerable allowance must be made for the manner in which much of the moisture is retained among the interstices of the woody fibre, and the extent to which the latter has been laminated. In some powerful modern mills, the megass is turned out something like a web of cloth or paper, and might be as easily dried. The question of details will probably offer no insuperable difficulties to those accustomed to the practical management of heated air currents; it will therefore be unnecessary to offer here any opinion as to whether the air should be driven through the ashpit by a fanner, or taken heated from the end of the flue; in either case it would, if of efficient action, probably do away with the necessity of erecting, for the sake of draught, high chimnies in colonies where earthquakes occasionally happen.

I am, &c.,

HY. MITCHELL, M.D., Ph.D.

Trinidad, Feb. 22nd, 1858.

Home Correspondence.

MR. ASHWORTH'S PAPER ON COTTON.

SIR,—I did not leave the meeting of the Society of Arts, on Wednesday evening last, until the chairman, owing to the lateness of the hour, had declined to comment upon Mr. Ashworth's paper, or upon the subsequent discussion. I inferred, therefore, that the business of the evening had terminated, otherwise I should have been present, and have responded to the call of some members to reply to two questions proposed in Mr. Ashworth's closing remarks. The two questions were—"What number of Europeans have availed themselves of the Government rules to secure for themselves land in India in perpetuity;" and "What is the amount of the exports and imports from and to India?" Both these questions were intended, as Mr. Ashworth hoped, to weaken my statements; but in my absence he answered them himself, and proved the vagueness of the assumptions with respect to Indian facts which I had lamented in the discussion. He assumed that there were only from 300 to 400 European settlers in all India, but he might just as well have assumed any other number, as there are not any official returns on the subject. Mr. Ashworth inferred either that land was not obtainable, or that it was not worth getting; in either case forgetting that he had charged the Indian Government with refusing to grant land in perpetuity, and consequently Europeans could not become owners of the soil, a statement which I had proved unfounded in fact, by citing the Government rules for granting land. Mr. Ashworth answered his own question about exports from India, by "judging" them to be about twelve millions sterling, and added, "Did this indicate prosperity?" My reply to Mr. Ashworth's "judging" is, that the exports from India in 1834-5 were £7,993,420, and in 1855-6 they were £23,039,268, being an increase of 188 per cent. The imports in 1834-5 were £4,261,106, and in 1855-6 they were £13,947,657, an increase of 227 per cent., but leaving a balance of trade in favour of India in the first year of nearly four millions sterling, and in the last year of more than nine millions, which balance was paid in silver, and did not go out of India again; and Mr. Ashworth stated that in the last 27 years these payments had amounted to 150 millions sterling, and yet, in the same breath, he asks "does this indicate prosperity?" The fact is, the great balance of trade in favour of India is greatly owing to the manufacturers of Great Britain not adapting their products to the wants of the people of India. A small supply of woollens suffice for a people who, for some months in the year, would be glad to get rid of their own skins, if they could cool themselves by so doing. They do not want our wines, spirits, and beer, our hardware, glass, stationery, books, apparel, &c., &c., but India might take articles of clothing, turbans, women's sashes, loin cloths, sheets, and other articles of personal clothing, provided the manufacturers of England would send them out to India of the inflexible usage form, in length, breadth, fineness, marginal borders, tuft or fringe ends, &c., &c.; but this common-sense plan the manufacturers have never yet adopted, and the result has been the enormous balance of trade in favour of India, to be paid annually in silver. To enable the manufacturers to judge for themselves of the kind of apparel in use amongst 181 millions of people in India, the Court of Directors of the East India Company have extended their Museum at the India House, to embrace, for exhibition and examination, all the textile fabrics of India; and these are open, upon application at the India House, to the inspection of all manufacturers; and it will be their own fault if they do not take advantage of the opportunities offered to them. The Court, also, have made a collection of all the raw products of India, par-

ticularly of the fibrous kind, in the hope that new articles of import may be found amongst them, to the advantage of commerce and the manufacturing interests.

The New Museum is open to the public every Friday.
I am, &c.,

W. H. SYKES.

London, 15th March, 1858.

PUDDLED STEEL.

SIR,—I have read with much interest Mr. Clay's paper on puddled steel, and I have recently taken the opportunity (while in Liverpool on other business) to go to Messrs. Naylor's works, and see specimens of the rails, plates, rivets, &c., made of that material.

In considering the application of such a material to engineering purposes, the first idea which suggests itself is its employment in the case of rails subjected to wearing.

Let us assume the duration of rails on lines of heavy traffic at 10 years; of medium traffic at 20 years; of light branch traffic at 30 years. Taking the average price of rails at £8 per ton, and the cost of manufacture at £3 per ton, and putting aside the question of compound interest, which is never practically used, we have for the annual cost of renewal on lines of

Heavy traffic	6s. per ton, per annum.
Medium traffic	3s. " "
Light traffic	2s. " "

If we suppose the steel rails did not wear at all, then, taking money at 5 per cent., this commercial value, above that of common rails, would be on lines of

	s.	£.
Heavy traffic.....	6 × 20 = 6	per ton.
Medium traffic.....	3 × 20 = 3	"
Light traffic.....	2 × 20 = 2	"

And taking the cost of common rails at £8 per ton, the relative commercial value of rails, which would last for ever, would be in lines of

	£	£	£
Heavy traffic.....	8 + 6 = 14	per ton.	
Medium traffic.....	8 + 3 = 11	"	
Light traffic.....	8 + 2 = 10	"	

But steel rails, though capable of great duration, will not last for ever; and, when worn out, are more expensive than iron to re-manufacture. Their price must, therefore be less than £14 per ton, to render their adoption advantageous even on lines of heavy traffic, and they must be produced at a still lower price to render them generally preferable to a well-made iron rail.

In the view of the cost above given nothing is allowed for the labour of taking out old rails and putting in the new, but the introduction of this item would affect the result very little.

In the case of rails for points and crossings the value of increased durability is much more important. Here, in addition to the cost of the rail and its re-manufacture, there are the maker's charges for cutting, bending, planing, &c., which amount to about £4 per ton. The duration of the best iron point and crossing rails in situations of large traffic is frequently not more than six months, and, in particular situations, even less than that.

With iron rails, used in points and crossings, therefore, there is an annual cost in renewal equal to $(3 + 4) 2 = £14$ per ton per annum. If the steel rails cost £15 per ton, and the manufacture into points and crossings £10 per ton, including cutting and planing, &c., and the duration, in a like situation, is four times that of common rails—then we have for the annual expense, including interest of money on the first cost:—for common point and crossing rails £14 8s. per ton per annum; steel rails £5 15s. per ton per annum.

Another application of this new material is for engineering structures, where strength is the object sought;

and for these purposes advantages of a very striking nature present themselves.

The steel produced by this process is stated to possess three times the tensile resistance of wrought-iron, and if its resistance to compression is in a like ratio, the results which arise are as follows:—

If w , l , d , and a , represent the weight, length, depth, and sectional area of a girder of iron $\frac{wl}{a} = c$, a constant for similar forms of girder. If the girder is so constructed that equal portions of its length represent equal weights, and a load be equally distributed $= nl$, then, $\frac{(w + nl)l}{a} = c$, a constant for similar forms of girder.

In like manner if w' , l' , d' , a' , represent the weight, length, depth, and sectional area of a steel girder, $\frac{(w' + nl')l'}{a'} = c'$, the constant for steel in similar girders. But as steel is three times the strength of iron, while the specific gravities are nearly the same, we have for equal strengths $\frac{3(w + nl)l}{da} = \frac{(w' + nl')l'}{d'a'}$. And

in the case where the length and depth of the steel girders are the same as those of the iron, the weight of the steel girders would be $w' = \frac{wnl}{2w + 3nl}$.

Let us apply this to the case of the Menai tube. The weight of each of the principal tubes is 1,553 tons, the length is 460 feet, and the maximum load equals 1 ton per foot, then, $w' = \frac{1553 \times 460}{2 \times 1553 + 3 \times 460} = 160$ tons nearly. Thus a girder of steel, of like dimensions as wrought iron, excepting in the thickness of the plates, weighing 160 tons, would possess the same strength as the Menai tube in wrought iron, which weighs 1,553 tons. Some modifications in the details of construction would be required, especially to resist buckling at the top; but the broad feature of the result is as above stated.

Considering the difference in the expenses of the apparatus for floating and lifting the smaller weight, as compared with the larger, and the difference in the requisite strength of the piers, the introduction of wrought steel in girders of large dimensions is fraught with the most important results.

In making this statement it is, however, on the assumption that the compressive resistance bears the same proportion to the tensile as in wrought iron, and that the actual amounts of extension and compression within the limits of elasticity are not such as to cause undue deflection.

A carefully-conducted series of experiments should be made to ascertain the following properties of puddled steel in addition to the tensile strength, namely,—

- The ultimate compressive strength.
- The limits of elasticity for compression.
- The limits of elasticity for extension.
- The actual amount of extension.
- The actual amount of compression.
- The resistance to buckling.

Should these several properties be found, as is indeed probable, to bear a similar ratio to the tensile resistance as in wrought iron, the employment of wrought steel for large engineering structures (such as are now demanded for crossing some of the large rivers in India and Russia) promises to form an era in engineering quite as important as that of late years arising from the introduction of wrought iron.

I am, &c.,

W. H. BARLOW.

19, Great George-street, Westminster, S.W., March 17.

THE ECLIPSE OF THE SUN.

SIR,—The following observations may interest your readers. They were noted down at the time, and were

made on high ground, about 4 miles north of Tonbridge. I am, &c., H.

March 15, 1858.—Half-past 9 a.m.; wind nearly due north. One thermometer placed in the sun, aspect due south. A second in the shade, with a northerly aspect, and both exposed to the wind, at 2 ft. from the ground.

	Thermometer in Sun.	Do. in Shade.
9.30	{ Sun clear and } 75°	49°
10.30	{ shining } 71°	49°
11.0	{ brightly. } 69°	50°
11.7	Clouds..... 65°	—
11.15	Clouds..... 62½°	—
11.30	Clear, light clouds 75°	49°
11.35 75°	—
11.45 71½°	49°
11.55 72½°	—
12.0 69½°	48½

Sun partially obscured, but bright occasionally. Birds singing as in the early morning. wind moderated.

Sun partially obscured, but bright occasionally. Birds singing as in the early morning, wind moderated.

12.15 60.5 48.0
Birds singing; sheep feeding as usual.

12.30 Wind for a few minutes apparently gone; but a fresh breeze soon arose, preceded by a gust, as in a storm; Sun quite obscured. Thermometer, 55.5° in sun, 48° in shade; birds still singing as before, sheep grazing.

12.45 Lower wind, W.N.W., upper current, N. Darkness, that of a thunder-storm; birds continue singing, and sheep moving and grazing as usual. Wind N., Thermometer 53.5° in sun, 47° in shade.

12.55 52.5° 45.5°
Deficiency of light very sensible, but not so great as frequently occurs during a heavy storm—birds singing and sheep grazing as before.

1 p.m. Sun still invisible; there was no unnatural colour in the atmosphere; the darkness was not equal to that which frequently occurs during heavy storms.

1.15 The sun was visible again, but I was unable to watch the increasing temperature.

The difference of temperature due to the Eclipse, was, in the shade, 4.5°, from 50 to 45.5. In the sun, from 62.5°; the temperature at 11.15, when the sun had been obscured more or less by light clouds for three-quarters of an hour, to 52.5° or 10°.

The clouds not being so dense from 10.30 to 11.15, as from 11.30 to 1 p.m., it is hardly correct to attribute the 10° entirely to the Eclipse.

Proceedings of Institutions.

Lewes.—The report of the Mechanics' Institution for the past year, shows that the present number of members is 362; the increase during the year having been thirty-eight. The number of books (exclusive of those from Mudie's) issued from the library was 5,192. Seventeen lectures were delivered during the year. The soirée held on the 26th and 27th of February last was attended by 1,403 persons; the nett proceeds being £21 0s. 6d. This has been devoted to the furnishing of the Reading-room, and the purchase of a microscope, the excess of cost of the microscope, £4, having been defrayed by voluntary contributions. The number of vols. added to the library during the year was 150. Several vols. have been replaced, and about 140 rebound. The vocal music class has continued its weekly meetings through the whole year, and the elementary class, with the exception of the summer quarter, its bi-weekly meeting.

MEETINGS FOR THE ENSUING WEEK.

- MON. Royal Inst., 3. Prof. Huxley, "On Biology."
Architects, 8. Mr. James Blake, "Descriptive particulars and critical remarks on the Remains of the Abbey of Killeenah, Ireland."
Geographical, 8½.
- TUES. Royal Inst., 3. Prof. Huxley, "On Biology."
Civil Engineers, 8. Continued Discussion, "On Submerging and Repairing Submarine Telegraph Cables." And Mr. R. C. Despard, "On the Improvements of the River Lee Navigation; with remarks on Canals."
Med. and Chirurg., 8½.
Zoological, 9.
United Service Inst., 8½. Dr. Guy, "On the Report of the Commissioners appointed to inquire into the regulations affecting the Sanitary Condition of the Army, and especially the want of space."
- WED. Royal Soc. Lit., 4½.
Meteorological, 7. I. Dr. Tripe, "Observations on the Meteorology and Mortality of London in 1857." II. Mr. Bollaert, F.R.G.S., "On the History of the Meteoric Iron of the Desert of Atacama." III. Mr. Glaisher, "Meteorological Observations, &c., during the Solar Eclipse."
Society of Arts, 8. Mr. Thos. Allan, "On Electro-motive Machines."
Geological, 8. I. Mr. G. W. Ormerod, F.G.S., "On the Rock basins of Dartmoor." II. Mr. J. Leckenby, "On the Kelloways Rock of the Yorkshire Coast." III. Mr. J. C. Moore, F.R.S. and G.S., "On a Protrusion of Silurian Rock north of Ayrshire."
Archaeological Assn., 8½.
- THURS. Royal Inst., 3. Prof. Tyndall, "On Heat."
Geological Museum, Jermyn-street, 3. Professor Owen, "On Palæozoic and Triassic Reptiles." (3rd Lecture).
Royal Society Club, 6.
Numismatic, 7.
Antiquaries, 8.
Royal, 8½.
- FRI. Geological Museum, Jermyn-street, 3. Professor Owen, "On Palæozoic and Triassic Reptiles." (4th Lecture).
United Service Inst., 3. Mr. J. Boucher, "On the Rise and Progress of the Minié Expansion System, including Remarks on the Rifle Projectiles of various countries."
Royal Inst., 8½. Rev. J. Barlow, "On the Mineral Candles and other products manufactured at Belmont."
- SAT. Royal Inst., 3. Prof. Bloxam, "On the Chemistry of the Elements which circulate in Nature."
Medical, 8.

PARLIAMENTARY REPORTS.

PRINTED SESSIONAL PAPERS.

- Parl. No.
Delivered on 23rd, 24th, 25th, and 26th February, 1858.
52. County Rates—Return.
62. Woods, Forests, and Land Revenues—Abstract Accounts.
78. Irish Reproductive Loan Fund—Account.
91. School Books (Ireland)—Return.
51. Sheriff Small Debt Courts (Scotland)—Return.
89. Court of Chancery—Return.
90. Divine Service (Army) Return.
93. Duchy of Cornwall—Account.
42. Poor Relief (Scotland)—Return (a corrected copy).
19. Bills—Grand Juries (Ireland).
24. ——— Government of India.
22. ——— Tenant's Compensation (Ireland).
25. ——— General Board of Health (Skipton).
Foreign Refugees—Copy of Despatch from Her Majesty's Ambassador at Paris.
China—Correspondence with the Chinese High Commissioner Yeh.
Delivered on 27th February, and 1st March, 1858.
85. Select Committees—Return.
92. Police (Scotland)—Rules and Regulations.
31. Property Tax and Population, &c.—Return.
97. Committee of Selection—Second Report.
Poor Relief (Scotland)—12th Report of the Board of Supervision.
SECOND SESSION, 1857.
306. Emigration (Australian Colonies)—Return.
Delivered on 2nd, 4th, 5th, 6th, 8th, 10th, 11th, and 12th March, 1858.
96. Revenue Departments—Estimates.
95. Excise Officers and Surveyors, &c., of Taxes (Scotland) Treasury Minutes.
100. New Zealand—Copy of Despatch.
101. Corn, &c., (Ireland)—Return.
102. East India (Annexation of Oude)—Return.
61. Works and Public Buildings—Abstract Accounts.
88. Hops—Account.
103. Quarantine—Return.
94. Public Monies—Copy of Treasury Minute.
99. Hudson's Bay Company—Return.
107. Aggravated Assaults (Metropolis)—Return.
72. East India (Education)—Copies of Correspondence.
98. Poor Rates and Pauperism—Return (A).

104. Immigrants and Liberated Africans—Return.
109. Hampton Court Palace and Kew Gardens—Return.
111. Spirits (Scotland)—Returns.
106. Quit Rents (Ireland)—Return.
108. Registered Electors—Return.
112. Kensington Gore Estate—Return.
Colonel Robert Frith—Copies of Papers and Correspondence.
SESSION (SECOND), 1857.
296. East India (Cotton)—Return, Part 2, Madras.
331. Election Expenses—Abstract of Return.
Delivered on 13th and 15th March, 1858.
110. Exports and Imports—Accounts.
105. Bermuda—Return.
114. Committee of Selection—Third Report.
116. Army (Embodied Militia)—Supplementary Estimate.
124. General Committee of Elections—Mr. Speaker's Warrant.
113. Harbour, &c., Bills (Blyth Harbour and Dock; 1. Llanelly Harbour; 2. London Dock Company; 3. Trent Navigation; 4. Whitehaven Harbour; 5. Burghhead Harbour; 6. Tees Conservancy; 7. Fishguard Harbour Improvement; 8. Leitrim Railway and Lough Allen Pier; 9. Hesketh Marsh; 10. Yarr Bridge; 11. Tyne Improvement; 12. Plymouth Great Western Docks; 13. Wexford Harbour Embankment)—Board of Trade Reports.
117. Railway and Canal Bills (1. Alyth Railway; 2. Caledonian Railway (Dalmarnock Branch); 3. Carron Railway; 4. Dundalk and Enniskillen Railway; 5. Ely Valley and Eden Valley Railway; 6. Liskeard and Looe Union Canal Company; 7. Midland Great Western Railway of Ireland; 8. North Yorkshire and Cleveland Railway; 9. Salisbury and Yeovil Railway; 10. Selkirk and Galashiels Railway; 11. South Devon and Tavistock Railway; 12. Lynton, Biggar, and Broughton Railway; 13. Vale of Toway Railway; 14. Worcester and Hereford Railway)—Board of Trade Reports.
East Indies (Mutinies)—Further Papers (No. 6).
Births, Baptisms, &c. (Non-parochial Registers or Records)—Report of Commissioners.
Delivered on 16th March, 1858.
86. East India (North-Western Provinces, &c.)—Return (a corrected Copy).
26. Bill—Agricultural Statistics.
France—Correspondence respecting Foreign Refugees in England.

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.
[From Gazette, March 12, 1858.]

- Dated 18th Feb., 1858.*
308. W. H. Crispin, Marshgate-lane, Stratford—Imp. in the construction of bearings, beds, and sockets for axles, shafts, pivots, and other rotating parts of machinery.
310. G. Claridge, Pontypool Iron Works, and R. S. Roper, F.G.S., F.C.S., Ebbw Vale Iron Works, Monmouth—An improved mode of manufacturing coke.
312. J. Chadwick, Glasgow—Imp. in machinery or apparatus for engraving or producing printing surfaces.
314. F. Jones, Manchester—Certain imp. in machinery or apparatus for cutting 'plassave,' or other fibrous substances employed in the manufacture of brushes, which said imp. are also applicable to other purposes of cutting.
- Dated 19th Feb., 1858.*
316. W. Riley, Liverpool—An improved method of raising and lifting water from the bilge or holds of ships and other vessels, and in a peculiar construction and arrangement for effecting the same.
318. J. Champion, Manchester—Imp. in spinning cotton, silk, flax, wool, and other fibrous materials.
320. E. Maw, Doncaster Iron Works, Yorkshire—Imp. in the manufacture of iron wheels.
322. I. Brown, Carlisle, and J. Brown, Notting Hill—Imp. in machinery or apparatus for reducing bones.
324. W. Skallitzky, Vienna—Imp. in the manufacture of socks and stockings.
- Dated 22nd Feb., 1858.*
326. W. E. Nethersole, Swansea—Imp. in the construction of parts of railway carriages.
330. H. Edwards, Bishopsgate street—Imp. in stoppers for feeding bottles and other vessels.
332. T. Green, Leeds—Imp. in mowing machinery.
334. W. Greene, 21, Merlin's-place, Clerkenwell, and M. C. Greene, 19, Hatton garden—Imp. in joining soft metal pipes.
336. A. Myers, 12, Hutchison-street, Gravel-lane, Houndsditch—Imp. in the manufacture of caps or coverings for the head.
340. W. Betts, Wharf-road, City-road—A new manufacture of glazed or enamelled paper.
- Dated 22nd Feb., 1858.*
342. John Davis, 11, Burlington-cottages, Queen's road, Dalston—Imp. in cornets and other wind musical instruments.
344. W. Hall, Erith—Imp. apparatus for working railway breaks.
346. R. A. Brooman, 166, Fleet street—Imp. in machinery for effecting the amalgamation of precious metals. (A com.)
- Dated 23rd Feb., 1858.*
348. F. Puls, Haverstock-hill—The manufacture of certain hydrocarbons.
350. W. Johnston, Glasgow—Imp. in apparatus for regulating or controlling the flow or passage of fluids.

352. R. A. Brooman, 166, Fleet-street—Imp. in apparatus for separating substances of different specific gravities. (A com.)
 354. E. Toynbee, London—Imp. in the manufacture of manure.
 356. J. Boydell, 65, Gloucester-crescent, Camden-town—Imp. in locomotive carriages.

Dated 24th Feb., 1858.

358. A. C. Hobbs, 76, Cheapside, London—A domestic bell telegraph.
 360. E. Borlase, St. Just, near Penzance, Cornwall—Improved apparatus for separating metals and metallic ores from other mineral substances.
 362. J. Henderson, Glasgow—Imp. in shells or explosive projectiles.
 364. C. Kaye, Lockwood—Imp. in couplings for connecting and disconnecting wagons and other carriages on railways.
 366. A. V. Newton, 66, Chancery-lane—Certain improved means of relieving the slide valves of steam engines of unnecessary friction. (A com.)
 368. A. V. Newton, 66, Chancery-lane—A mode of varying the length and reversing the direction of the throw of an eccentric, applicable to the reversing gear of locomotives and expansion gear of other steam engines, and to other purposes. (A com.)
 372. A. Applegath, Dartford, Kent—Imp. in printing machinery.

Dated 25th Feb., 1858.

373. W. Tatham, Rochdale—Imp. in machinery, or apparatus for lubricating the pistons, piston rods, cylinders, and other parts of steam or other engines, and which is applicable to other purposes where lubricating matter is required.
 374. J. Arnold, Newton Moor, near Hyde—Imp. in metallic pistons.
 375. J. B. Barnes, Summer-lane, and J. Loach, Caroline-street, Birmingham—Certain improvements in apparatus for descending and ascending the shafts of mines or other deep pits, the descent and ascent of which imperils the lives of the miners or others employed therein.
 376. J. Templeman, Dunfermline—Imp. in the manufacture or production of artificial fuel.
 377. W. Slater, and S. Smith, Bolton-le-Moors—Imp. in machinery to be used in turning and cutting metals.
 379. J. T. Pitman, 67, Gracechurch street—Imp. in hand lever self-inking printing presses, for printing cards, envelopes, bill-heads, and other articles. (A com.)
 380. A. V. Newton, 66, Chancery-lane—Improved machinery for grinding and polishing glass, stone, metal, and other substances. (A com.)
 381. L. P. Lambert-Alexandre, Paris—Imp. in apparatus and signals for preventing accidents on railways.

Dated 26th Feb., 1858.

382. J. Morison, sen., and J. Morison, jun., Paisley, Renfrew, N.B.—Imp. in Jacquard apparatus used in weaving.
 383. W. C. Smith, 31, Lincoln's-inn fields—Imp. in the manufacture of envelopes for letters and other purposes. (A com.)
 384. W. Chadwick, Bury—Imp. in ventilators.
 385. H. Mackworth, Clifton—Imp. in the separation, raising, and lowering of coal and other minerals, and in cooking, and in apparatus connected therewith.

Dated 27th Feb., 1858.

387. S. Hoga, Nassau-street—Imp. in applying power in locomotion, by which a given force may, in its effect of overcoming resistance, be increased and multiplied.
 388. J. Knott, 63, Oakley-street, Lambeth—An improved feeding-bottle.
 389. J. T. Raymond and A. Lambert, Caledonian-road—Ornamenting textile fabrics.
 391. L. Galli, Milan, Italy—A process of superseding wood engraving, which he calls Gallitry.
 392. W. Cave, Rathbone-place—Imp. in apparatus for propelling vessels, carriages, and machinery.
 393. M. Henry, 77, Fleet-street—Imp. in electro-magnetic motors. (A com.)
 394. W. A. Gilbee, 4, South-street, Finsbury—An improved union joint for gas, water, and steam pipes, also applicable to the branch pipes of fire-engines. (A com.)
 395. W. A. Gilbee, 4, South street, Finsbury—Imp. in the branch pipes of fire-engines or pumps. (A com.)
 396. W. Clark, 53, Chancery-lane—Imp. in preparing paper for, and in obtaining, photographic proofs or impressions. (A com.)

Dated 1st March, 1858.

397. J. G. Newey and W. M. Newey, Birmingham—Imp. in fastenings, especially for or applicable to wearing apparel, and purposes where a spring connexion or adjustment is desirable, in arranging for sale and packing fastenings and ornaments, and in ornaments for personal wear.
 399. A. V. Schuttenbach, St. Petersburg—An improvement in treating fatty and oily matters.
 400. J. Hadfield, Chelmsford—Imp. in the manufacture of manure and other products, when treating sewage matters, and in the manufacture of colours.
 401. J. Kingsford, Upper Marsh, Lambeth—Imp. in lamps.
 402. D. Greenley, Upper Cumming-street, Pentonville, and T. B. Daft, Bedford-street North, Liverpool—Imp. in machinery for boring for water, or for other purposes.
 403. H. M. Platt, New York—Imp. in ploughing and tilling land.
 404. W. E. Newton, 66, Chancery-lane—Improved machinery for removing burrs and other extraneous substances from wool or skins. (A com.)

405. W. E. Newton, 66, Chancery-lane—Imp. in the treatment or preparation of maize or Indian corn, previous to grinding the same into flour. (A com.)

406. J. Billing, Abingdon-street—An improved throat and door for chimneys and flues.

Dated 2nd March, 1858.

407. J. Skelly, Kilcurry, Ireland—Imp. in carriage springs.
 408. J. Bircumshaw, Lenton, Nottingham—Imp. in machinery for dressing lace made of silk, cotton, or other material.
 409. R. A. Brooman, 166, Fleet street—An apparatus for separating substances of different specific gravities, and for washing sands and earth. (A com.)
 410. A. Ripley, 10, Alfred-place, Newington-causeway, Southwark—Imp. in machinery for rolling and polishing leather, and tanned or untanned hides.
 411. J. H. Johnson, 47, Lincoln's-inn fields—Imp. in surcharging or regenerating steam, and in the application of the same to steam engines. (A com.)
 412. W. Hooper, Mitcham, Surrey—Imp. in the manufacture of buffer and other springs when vulcanized india rubber is used.
 413. A. V. Newton, 66, Chancery-lane—An imp. in the process of manufacturing soda and potash. (A com.)
 414. W. S. Driggs, New York—Imp. in pianofortes. (A com.)

Dated 3rd March, 1858.

415. E. H. C. Monckton, Parthenon Club, Regent-street—Imp. in distilling and rectifying, and in the apparatus to be employed therein.
 417. P. J. Gautrot, Paris—Instantaneous tents, invented purposely for the use of public vehicles called omnibuses, but which can also be applied to any others, open vehicles, carts, or waggons, and travelling hawkers, at a very low cost; new system of shelter against the inclemency of the weather.
 419. B. Parker, Hammersmith—The manufacture of materials for coating, cementing, bedding, and otherwise protecting bodies, and which are also applicable to the construction or formation of various articles.
 421. W. Scoble, Bow Common-lane, Mile end—Arranging the retorts, furnaces, flues, communications and connections, for the more economical manufacture of gas, and by which arrangement the generative heat may be obtained from either coal, coke, tar, or other similar combustible substances.
 423. W. H. Graveley, Upper East Smithfield—An apparatus for purifying sea and other mineral waters, and rendering them fit to drink.
 425. G. A. Biddell, Ipswich—Imp. in machines for cutting vegetable and other substances.

INVENTIONS WITH COMPLETE SPECIFICATION FILED.

422. G. J. Parson, Adelphi-terrace, Strand, and T. Pilgrim, Bow—Imp. in the mode of raising the temperature of steam generated in steam boilers, and using the same for working steam engines.—3rd March, 1858.
 436. C. Eyland, Walsall—An improvement or improvements in certain descriptions of buckles.—4th March, 1858.

WEEKLY LIST OF PATENTS SEALED.

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| <i>March 12th.</i> | 3182. V. Mourot. |
| 2372. N. Fisher. | 32. S. Lees. |
| 2374. C. Watson. | 62. J. Broadley. |
| 2378. J. Leeming. | 70. M. A. F. Mennons. |
| 2379. W. Gossage. | <i>March 16th.</i> |
| 2381. T. Marsh. | 2411. I. L. Pulvermacher. |
| 2387. R. Shiers. | 2421. S. Whitehead. |
| 2388. J. Ashby. | 2422. S. Faulkner. |
| 2390. T. Grahame. | 2425. T. Wilson. |
| 2397. R. Wicks. | 2426. D. Lichtenstadt. |
| 2399. A. Seward and C. Seward. | 2437. W. H. James. |
| 2400. C. W. Lancaster. | 2441. H. Ormon. |
| 2402. J. H. Winder. | 2453. M. Theiler. |
| 2403. W. Middleton, junr., and T. T. Chellingworth. | 2458. G. Rennie. |
| 2414. W. Smith. | 2472. T. Saunders. |
| 2417. J. M. Munro, junr. | 2509. J. H. Johnson. |
| 2420. C. Delevante. | 2512. J. Paisley and G. Bertram. |
| 2445. G. Schaub. | 2530. G. W. Shibles. |
| 2667. Y. Péan. | 2535. R. Green. |
| 2841. J. T. Way. | 2541. W. E. Newton. |
| 2994. J. Fowler, junr., and W. Worby. | 2552. J. Combe. |
| 3131. F. Taylor. | 2820. W. Macnab. |
| 3175. J. Cottrill. | 3172. J. Boydell. |
| 3177. I. Holden. | 3184. A. Parkes. |
| | G. A. Parkes and H. Parkes. |

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

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| <i>March 8th.</i> | <i>March 11th.</i> |
| 534. S. C. Lister. | 571. J. Marland. |
| 538. S. C. Lister. | 749. F. Joyce. |
| <i>March 9th.</i> | <i>March 12th.</i> |
| 555. J. M. Napier. | 567. B. Goodfellow. |
| 591. W. Hill. | 574. E. J. Mitchell. |
| 662. G. A. Barrett, W. Exall, and C. J. Andrewes. | <i>March 13th.</i> |
| <i>March 10th.</i> | 568. R. Neale. |
| 570. W. Galloway and J. Galloway. | 572. E. V. Gardner. |
| 768. R. W. Waithman. | 584. R. M. Butt. |
| | 1207. T. Waterhouse. |